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# U.S. DEPARTMENT OF THE INTERIOR

# PROTOTYPE OIL SHALE LEASING PROGRAM

## TRACT C-b

## QUARTERLY REPORT #2

(Through February 28, 1975)

Submitted to:

Mr. Peter A. Rutledge
Area Oil Shale Supervisor
Conservation District
U. S. Geological Survey
Grand Junction, Colorado

By:

Ashland Oil, Inc.
Atlantic Richfield Company, Operator
Shell Oil Company
The Oil Shale Corporation

APRIL 14, 1975

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The Oil Shale Corporation

APRIL 14, 1975

PRE-EXPLORATION ENVIRONMENTAL
RECONNAISSANCE SURVEYS

# I PRE-EXPLORATION ENVIRONMENTAL RECONNAISSANCE SURVEYS

Pre-exploration environmental reconnaissance surveys, as described in Quarterly Report #1, are conducted by a team of experts in the fields of plant ecology, animal ecology, archaeology and, as needed, aquatic ecology. These surveys are conducted prior to any appreciable disturbance of the Tract C-b area for the purpose of 1) ensuring that activities are not planned in significant habitat, vegetation, or archaeological areas, and 2) providing a record of existing conditions for use in later rehabilitation of the disturbed areas.

The only reconnaissance work required during this quarter for areas of potential ground disturbance was for the drilling of slant core holes. Reports from these investigations, insofar as they have been completed, are included on the following pages. Where investigations have not yet been performed because of snow conditions, the planned exploration activities have been postponed until these investigations are completed and any recommendations made by the investigators are evaluated. The present status of these slant core hole investigations is shown at the bottom of Table 1-1.

## TABLE I-1

## STATUS OF PRE-EXPLORATION ENVIRONMENTAL INVESTIGATIONS - 4/1/75

| LOCATION | ARCHAEOLOGICAL EVALUATION | PLANT, ANIMAL, AND AQUATIC EVALUATION |
|---|---|---|
| Coreholes SG-1 through SG-21 and Roads | X | X |
| Surface Water Stations 1 through 13 | X | ---1 |
| Support Facilities | X | X |
| Air Quality Sites (5) and Meteorological Tower | X | X |
| Alluvial Wells ("A" Series) 1 through 13 | X | X |
| Relocation of Coreholes SG-6 and SG-7 | X | X |
| Relocation of Corehole SG-17 | X* | X |
| Relocation of Roads to SG-4 and SG-17 | X | X |
| Biological Observation Plots | X* | X* |
| Powerlines | X | ---2 |
| Old Coreholes Cb-1, Cb-2, Cb-3, and Cb-4 | X* | X |
| Old Coreholes 71-1, 71-2, 71-3, TG2-1, TG3-2 & Fed 2-b | X | X |
| Road to SG-18 ("CH-18") | X | X |
| Area Surrounding Aquifer Test Site | X | X |
| Road from Piceance Creek to Cottonwood and Sorghum Gulches | X | X |
| Road from Piceance Creek to Tract | X | ---3 |
| Road between Cottonwood and Sorghum Gulches | X | X |
| Slant Hole Drill Sites NQ22A (#1), SG-22 (#2), NQ22 (#3), NQ4 (#4), NQ7 and NQ12 | X[4] | X |

* evaluation received through verbal communication; no written report

1 installed by USGS prior to biological reconnaissance; minimal disturbance

2 minimal biological disturbance

3 judgment that improvement of already heavily-travelled road would not result in increase in biological disturbance

4 waiting for field examination on SG22

ARCHAEOLOGICA

WOODWARD-CLYDE CONSULTANTS
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS

WESTERN REGION
Envicon Division
1633 Old Bayshore Highway
Suite 205
P.O Box 4187
Burlingame
California 94010
Phone (415) 692-5310

February 12, 1975
74-669

Dr. Martin Redding
Atlantic Richfield Company
Two Park Central, Suite 555
1515 Arapahoe Street
Denver, Colorado 80202

Dear Dr. Redding:

As requested by Ms. Joan Gibbs of your office, our biological team conducted a reconnaissance of four proposed slant hole sites on Tract C-b during the week of January 13, 1975. Site Nos. 1, 2, and 3 are located at the upper end of the west fork of Cottonwood Gulch, the upper end of the east fork of Cottonwood Gulch, and adjacent to the southern boundary of the aquifer test site overlooking Cottonwood Gulch, respectively. Site No. 4 is located on a ridge overlooking Scandard Gulch one-half mile southeast of Core Hole 4. We understand that each drill pad will have dimensions of 50 feet by 75 feet. Dr. Joe Merino, the head of our biological team, reports as follows on the reconnaissance.

The first three sites are located entirely within a chained pinyon-juniper area. Vegetation consists of species characteristic of the mountain shrub association (i.e., mountain mahogany, serviceberry, bitterbrush, etc.). The fourth site is located within a chained pinyon-juniper area which is bordered by a pinyon-juniper woodland. Vegetation consists mainly of sagebrush and some mountain shrub association plants. Along the northeast boundary of the pad, three pinyon trees, including a large mature pinyon, and two juniper trees will be removed when the drill pad is constructed. None of the sites appear to be rare or unique in an ecological sense.

All four drill sites are similar to areas currently under thorough study on Tract C-b. Individually, these sites along with access roads will have a minimal ecological impact. However, as more drill sites and roads are cleared of all vegetation, the impact is compounded. Removal of deer browse and small animal habitat will result from the planned activity on the proposed drill pads.

Whenever possible, existing roads should be used as access roads to the drill sites.

Sincerely,

C. Batra
Program Manager, Industry

cc: Dr. Joe Merino
Ms. Carol Hopkins
Ms. Joan Gibbs

Department of Anthropology
Laboratory of Public Archaeology

**Colorado State University**
Fort Collins, Colorado
80523

March 10, 1975

Ms. Carol Hopkins
Atlantic Richfield Co.
Two Park Central, Suite 555
1515 Arapahoe Street
Denver, Colorado 80202

Dear Carol:

In reference to your letter of February 11, I can provide you with the following information.

Drill Site NQ22A: No further field examination is necessary. We surveyed the entire southeastern quarter of Section 12 during the baseline study last summer. There are no archaeological sites in the quarter section.

Drill Site NQ4: No further field examination is necessary. The locality was examined in the process of clearing the alignment of the road to SG4 last summer. No archaeological sites will be endangered by the drilling.

Drill Site SG22: We will have to examine this site as there has been no previous work in the locality close enough to the drill site to warrant clearing the activity. We will have to wait until the snow cover conditions have reached a point where a reliable examination can be conducted. I will notify you when we have completed the work.

Sincerely,

Cal

Calvin H. Jennings
Director

CHJ/apm

# ENVRIONMENTAL BASELINE
# MONITORING PROGRAMS

SURFACE
WATER

# II A SURFACE WATER

During the second quarterly report period, water samples were obtainable from six of the thirteen stations on and near Tract C-b. (Tables II A-1 through II A-6). A separate set of samples was also collected from the four major stations by the U.S.G.S. during the week of December 4, 1974, and forwarded to Denver for analysis of organic components. Most of the stations remained dry, however, although a considerable quantity of snow fell during the report period. Snow surveys are underway, and a summary of the results will be available later in the spring. Weather conditions were quite severe at times and temperatures reached -52°F. at the Rock School meteorological station. As a result, many of the streams were frozen over, and automated measurements were difficult, if not impossible to obtain.

The data from U.S.G.S. Station No. 09306039 Cottonwood Gulch near Rio Blanco (Table II A-4 on page II A-5) represent the discharge water from the upper zone aquifer pumping test of AT-1. The test well is located approximately two miles up the gulch and was discharging approximately 1 cfs from the well head at the time. The loss in water (.38 cfs at the gauging station vs. 1 cfs at the well head) occurred because water seeped into the two mile stretch of dry stream bed.

# II A-1 STREAMS

Tables II A-1 through II A-6 immediately following are summary tables by sample collection date of surface water quality analyses. The lab sheets and the U.S.G.S. computer printouts follow those summary tables.

TABLE II-A-1
PICEANCE CREEK BELOW RIO BLANCO
U.S.G.S. NO. 09306007
OCTOBER 1974 - FEBRUARY 1975

| | 10/4 | 10/9 | 10/16 | 10/23 | 10/31 | 11/6 | 11/20 | 12/4 | 12/18 | 12/31 | 1/15/75 | 2/3 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (*)1. Alkalinity (mg/l) | 440 | 462 | 449 | 445 | 478 | 472 | 430 | 424 | 442 | 454 | 453 | 461 | | |
| (*)2. Aluminum (ug/l) | | | | | | | | 450 | | | | | | |
| 3. Aromatics, Polycyclic | | | | | | | | | | | | | | |
| 4. Arsenic (ug/l) | 2 | 3 | 2 | 1 | 1 | 2 | 4 | 3 | 3 | 1 | 1 | 5 | | |
| 5. Barium (ug/l) | 0 | <100 | 100 | 0 | 100 | <100 | <100 | 130 | 100 | 100 | 0 | 100 | | |
| (*)6. Beryllium (ug/l) | | | | | | | | <1 | | | | | | |
| 7. Bicarbonate (mg/l) | 537 | 563 | 548 | 542 | 583 | 576 | 524 | 517 | 539 | 554 | 552 | 562 | | |
| (*)8. Bismuth (ug/l) | | | | | | | | <5 | | | | | | |
| 9. Boron (ug/l) | 260 | 290 | 200 | 280 | 190 | 250 | 230 | 130 | 220 | 210 | 240 | 190 | | |
| 10. Cadmium (ug/l) | <1 | <1 | 0 | 0 | 0 | 1 | 0 | <15 | 0 | 0 | 2 | 0 | | |
| 11. Carbonate (mg/l) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| (*)12. Carbon Dioxide (mg/l) | | | | | | | 8.4 | 5.2 | 3.4 | 4.4 | 7.0 | .9 | | |
| 13. Chloride (mg/l) | 16 | 17 | 16 | 16 | 15 | 16 | 16 | 13 | 15 | 14 | 16 | 19 | | |
| 14. Chromium (ug/l) | | | | | | | | <5 | 0 | 0 | 10 | 0 | | |
| (*)15. Cobalt (ug/l) | | | | | | | | <5 | | | | | | |
| 16. COD | | | | | | | | 9 | | | | | | |
| 17. Coliform, Total & Fecal | | | | | | | | | | | | | | |
| 18. Color | | | | | | | | 5 | 2 | 3 | 5 | 3 | | |
| 19. Conductivity, Specific (umr) | 1140 | 1190 | 1160 | 1160 | 1180 | 1200 | 1090 | 1070 | 1200 | 1100 | 1200 | 1120 | | |
| 20. Copper (ug/l) | 1 | 6 | 0 | 0 | 1 | 2 | 1 | 1 | 1 | 0 | 8 | 1 | | |
| 21. Cyanide (mg/l) | | | | | | | | .00 | .00 | .00 | .00 | .00 | | |
| 22. Discharge (CFS) | -- | 2.9 | 4.1 | 5.5 | -- | 6.0 | 9.5 | 9.8 | 11 | 7.8 | 9.5 | 12 | | |
| 23. Dissolved Oxygen | | | | | | | | | | | | | | |
| 24. Fluoride (mg/l) | 1.1 | 1.1 | 1.0 | 1.2 | 1.0 | 1.0 | 1.0 | 1.1 | 1.0 | 1.1 | 1.2 | 1.1 | | |
| (*)25. Gallium (ug/l) | | | | | | | | <3 | | | | | | |
| (*)26. Germanium (ug/l) | | | | | | | | <5 | | | | | | |
| (*)27. Hardness (Ca, Mg) (mg/l) | 370 | 350 | 380 | 360 | 400 | 360 | 350 | 330 | 390 | 360 | 370 | 370 | | |
| (*)28. Hardness, Non-Carbonate (mg/l) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 29. Iron (ug/l) | 30 | 60 | 60 | 80 | 40 | 390 | 10 | 300 | 10 | 10 | 20 | 20 | | |
| 30. Kjeldahl Nitrogen | | | | | | | | .30 | .33 | .25 | .48 | .61 | | |
| 31. Lead (ug/l) | 0 | 4 | 3 | 1 | 1 | 3 | 2 | <5 | 1 | 0 | 7 | 6 | | |
| 32. Lithium (ug/l) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 20 | 20 | 20 | 20 | | |
| 33. Magnesium (mg/l) | 49 | 43 | 50 | 46 | 50 | 42 | 42 | 45 | 48 | 43 | 46 | 46 | | |
| 34. Magnanese (ug/l) | 100 | 170 | 160 | 140 | 230 | 230 | 110 | 100 | 80 | 50 | 60 | 67 | | |
| 35. Mercury (ug/l) | .0 | .0 | .0 | .0 | .0 | .0 | .0 | <.1 | <.1 | .0 | .1 | .1 | | |
| (*)36. Molybdenum (ug/l) | | | | | | | | 7 | | | | | | |
| (*)37. Nickel (ug/l) | | | | | | | | <4 | | | | | | |
| 38. Nitrate (mg/l) | .07 | .03 | .02 | .00 | .04 | .07 | .26 | .38 | .33 | .43 | .56 | .32 | | |
| 39. Nitrite (mg/l) | | | | | | | | .00 | .02 | .00 | .01 | .01 | | |
| 40. Odor | | | | | | | | | | | | | | |
| 41. Oil & Grease | | | | | | | | 0 | 1 | 1 | 8 | 6 | | |
| 42. Ortho-Phosphate (mg/l) | .00 | .03 | .00 | .00 | .09 | .09 | .03 | .06 | .09 | .15 | .06 | .12 | | |
| (*)43. Ortho-Phosphorus (mg/l) | .00 | .01 | .00 | .00 | .03 | .03 | .01 | .02 | .03 | .05 | .02 | .04 | | |
| 44. Pesticides | | | | | | | | | | | | | | |
| 45. pH | | | | | | | | 8.2 | 8.4 | 8.3 | 8.1 | 9.0 | | |
| 46. Potassium (mg/l) | 2.8 | 3.1 | 3.3 | 3.5 | 3.8 | 3.8 | 2.9 | 2.4 | 2.9 | 2.9 | 3.4 | 2.6 | | |
| 47. Selenium (ug/l) | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 1 | | |
| 48. Silica (mg/l) | 17 | 17 | 17 | 16 | 18 | 16 | 15 | 15 | 3.4 | 16 | 17 | 16 | | |
| (*)49. Silver (ug/l) | | | | | | | | 0 | | | | | | |
| 50. Sodium (mg/l) | 140 | 150 | 140 | 130 | 140 | 140 | 130 | 120 | 130 | 120 | 130 | 130 | | |
| (*)51. Sodium Adsorption Ratio | 3.2 | 3.5 | 3.1 | 3.0 | 3.1 | 3.2 | 3.0 | 2.9 | 2.9 | 2.8 | 2.9 | 2.9 | | |
| (*)52. Sodium (%) | 45 | 48 | 41 | 44 | 43 | 46 | 44 | 44 | 42 | 42 | 43 | 43 | | |
| 53. Solids, Dissolved (mg/l) | 750 | 749 | 738 | 718 | 762 | 739 | 698 | 664 | 715 | 697 | 723 | 736 | | |
| 54. Solids, Suspended | | | | | | | | | | | | | | |
| (*)55. Strontium (ug/l) | | | | | | | | 1800 | | | | | | |
| 56. Sulfate (mg/l) | 170 | 170 | 170 | 170 | 170 | 160 | 160 | 150 | 170 | 150 | 160 | 170 | | |
| 57. Sulfide | | | | | | | | .0 | .5 | .9 | .0 | .1 | | |
| 58. Temperature (°C) | 13.0 | 14.0 | 13.0 | 11.0 | 5.0 | 5.0 | 4.0 | 4.0 | .0 | 1.0 | 1.0 | 1.0 | | |
| (*)59. Tin (ug/l) | | | | | | | | <5 | | | | | | |
| (*)60. Titanium (ug/l) | | | | | | | | 25 | | | | | | |
| 61. Turbidity | | | | | | | | 20 | 20 | 6 | 30 | 10 | | |
| (*)62. Vanadium (ug/l) | | | | | | | | <3.0 | | | | | | |
| 63. Zinc (ug/l) | 20 | 60 | 30 | 0 | 30 | 30 | 10 | <15 | 0 | 10 | 40 | 20 | | |
| 64. Zirconium (ug/l) | | | | | | | | <10 | | | | | | |
| 65. Calcium (mg/l) | 69 | 69 | 70 | 68 | 76 | 75 | 71 | 58 | 76 | 73 | 74 | 72 | | |
| 66. Complete Element Scan | | | | | | | | | | | | | | |
| 67. Radioactivity | | | | | | | | | | | | | | |
| Gross Alpha (pcl) | | | | | | | | | | | | | | |
| Radium 226* | | | | | | | | | | | | | | |
| Gross Beta | | | | | | | | | | | | | | |
| Thorium 230** | | | | | | | | | | | | | | |
| Uranium ** | | | | | | | | | | | | | | |
| 68. Total Organic Carbon (TOC) | | | | | | | | | | | | | | |
| If TOC > 10 mg/liter, then | | | | | | | | | | | | | | |
| Nitrogen (Base Extraction) | | | | | | | | | | | | | | |
| Organic Carbon, Dissolved | | | | | | | | | | | | | | |
| Organic Carbon, Suspended | | | | | | | | | | | | | | |
| Phenols | | | | | | | | | | | | | | |
| Sulfur (Acid Extraction) | | | | | | | | | | | | | | |

(*) Not Required

* Required if Gross Alpha > 4 picocuries per liter (pcl)
** Required if Gross Beta > 100 picocuries per liter (pcl)

N Non-Instantaneous Discharge

NOTE: A number preceded by a less than (<) sign represents the lowest detectable limit for the analytical method used for that particular sample run. Analytical method and thus lower limit may change across sample runs even for a single element.

# TABLE II-A-2
## STEWART GULCH Ab WEST FORK Nr RIO BLANCO
U.S.G.S. No. 09306022
OCTOBER 1974 - FEBRUARY 1975

| | 10/4 | 10/9 | 10/16 | 10/23 | 10/30 | 11/6 | 11/20 | 12/4 | 12/17 | 12/30 | 1/15/75 | 2/3 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (*)1. Alkalinity (mg/l) | 387 | 404 | 396 | 422 | 421 | 436 | 641 | 403 | 472 | 405 | 418 | 426 | | |
| (*)2. Aluminum (ug/l) | | | | | | | | | | | | | | |
| 3. Aromatics, Polycyclic | | | | | | | | | | | | | | |
| 4. Arsenic (ug/l) | 1 | 1 | 1 | 1 | 0 | 1 | 4 | 1 | 2 | 0 | 1 | 3 | | |
| 5. Barium (ug/l) | 0 | <100 | <100 | 0 | <100 | <100 | <100 | <100 | 100 | <100 | 100 | <100 | | |
| (*)6. Beryllium (ug/l) | | | | | | | | | | | | | | |
| 7. Bicarbonate (mg/l) | 472 | 492 | 483 | 514 | 513 | 531 | 782 | 491 | 575 | 494 | 510 | 519 | | |
| (*)8. Bismuth (ug/l) | | | | | | | | | | | | | | |
| 9. Boron (ug/l) | 110 | 100 | 50 | 110 | 30 | 120 | 530 | 90 | 260 | 80 | 120 | 70 | | |
| 10. Cadmium (ug/l) | 0 | <1 | 0 | 0 | 0 | 3 | 0 | 1 | 1 | 0 | 1 | 1 | | |
| 11. Carbonate (mg/l) | | | | | | | | 0 | 0 | 0 | 0 | 0 | | |
| (*)12. Carbon Dioxide (mg/l) | | | | | | | | 3.9 | 3.7 | 5.0 | 5.1 | 1.3 | | |
| 13. Chloride (mg/l) | 6.5 | 6.3 | 6.0 | 6.6 | 6.1 | 6.9 | 16 | 6.5 | 11 | 7.6 | 6.7 | 7.0 | | |
| 14. Chromium (ug/l) | | | | | | | | <10 | <10 | 0 | 10 | 0 | | |
| (*)15. Cobalt (ug/l) | | | | | | | | | | | | | | |
| 16. COD | | | | | | | | 5 | -- | | | | | |
| 17. Coliform, Total & Fecal | | | | | | | | | | | | | | |
| 18. Color | | | | | | | | 3 | 3 | 3 | 5 | 3 | | |
| 19. Conductivity, Specific (umr) | 1550 | 1530 | 1360 | 1400 | 1370 | 1460 | 1750 | 1360 | 1300 | 750 | 1300 | 1400 | | |
| 20. Copper (ug/l) | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 5 | 1 | 1 | 3 | 8 | | |
| 21. Cyanide (mg/l) | | | | | | | | .00 | .00 | .00 | .00 | .01 | | |
| 22. Discharge (CFS) | -- | 2.1 | 1.9 | 1.8 | 1.3 | 2.1 | 2.4 | 2.4 | 2.1 | 2.0 | 2.3 | 1.7 | | |
| 23. Dissolved Oxygen | | | | | | | | | | | | | | |
| 24. Fluoride (mg/l) | .2 | .2 | .2 | .3 | .3 | .6 | 3.3 | .2 | 1.2 | .2 | .2 | .4 | | |
| (*)25. Gallium (ug/l) | | | | | | | | | | | | | | |
| (*)26. Germanium (ug/l) | | | | | | | | | | | | | | |
| (*)27. Hardness (Ca, Mg) (mg/l) | 460 | 560 | 520 | 530 | 550 | 560 | 490 | 560 | 560 | 530 | 550 | 570 | | |
| (*)28. Hardness, Non-Carbonate (mg/l) | 75 | 150 | 130 | 100 | 130 | 120 | 0 | 150 | 85 | 130 | 130 | 140 | | |
| 29. Iron (ug/l) | 20 | 50 | 50 | 20 | 20 | 620 | 20 | 10 | 10 | 20 | 10 | 10 | | |
| 30. Kjeldahl Nitrogen | | | | | | | | .22 | .32 | .14 | .40 | .45 | | |
| 31. Lead (ug/l) | 1 | 2 | 2 | 1 | 2 | 3 | 2 | 5 | 1 | 2 | 7 | 6 | | |
| 32. Lithium (ug/l) | 0 | 0 | 0 | 0 | 0 | 0 | 40 | <10 | 20 | 10 | 10 | 10 | | |
| 33. Magnesium (mg/l) | 68 | 76 | 69 | 70 | 74 | 75 | 64 | 75 | 77 | 71 | 76 | 78 | | |
| 34. Magnanese (ug/l) | 0 | 10 | 0 | 0 | 0 | 20 | 0 | 20 | 0 | 0 | 10 | 40 | | |
| 35. Mercury (ug/l) | .0 | .0 | .0 | .0 | .0 | .0 | .0 | <.1 | <.1 | .0 | .0 | .0 | | |
| (*)36. Molybdenum (ug/l) | | | | | | | | | | | | | | |
| (*)37. Nickel (ug/l) | | | | | | | | | | | | | | |
| 38. Nitrate (mg/l) | 1.5 | 1.4 | 1.6 | 1.5 | 1.6 | 1.7 | 1.6 | 1.7 | 1.7 | 1.8 | 1.8 | 1.9 | | |
| 39. Nitrite (mg/l) | | | | | | | | .00 | .00 | .00 | .01 | .01 | | |
| 40. Odor | | | | | | | | | | | | | | |
| 41. Oil & Grease | | | | | | | | 2 | 1 | 1 | 7 | 9 | | |
| 42. Ortho-Phosphate (mg/l) | .06 | .03 | .03 | .00 | .03 | .09 | .03 | .03 | .03 | .15 | .03 | .12 | | |
| 43. Ortho-Phosphorus (mg/l) | .02 | .01 | .01 | .00 | .01 | .03 | .01 | .01 | .01 | .05 | .01 | .01 | | |
| 44. Pesticides | | | | | | | | | | | | | | |
| 45. pH | | | | | | | | 8.3 | 8.4 | 8.2 | 7.2 | 8.8 | | |
| 46. Potassium (mg/l) | 2.0 | 1.6 | 1.9 | 1.9 | 2.3 | 2.0 | 2.4 | 1.1 | 1.4 | 2.0 | 1.7 | 1.6 | | |
| 47. Selenium (ug/l) | 1 | 1 | 0 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | | |
| 48. Silica (mg/l) | 16 | 15 | 16 | 17 | 17 | 16 | 16 | 15 | 15 | 15 | 15 | 16 | | |
| (*)49. Silver (ug/l) | | | | | | | | | | | | | | |
| 50. Sodium (mg/l) | 130 | 120 | 120 | 120 | 120 | 130 | 250 | 120 | 130 | 120 | 120 | 120 | | |
| (*)51. Sodium Adsorption Ratio | 2.6 | 2.2 | 2.3 | 2.3 | 2.2 | 2.4 | 4.9 | 2.2 | 2.4 | 2.3 | 2.2 | 2.2 | | |
| (*)52. Sodium (%) | 38 | 32 | 33 | 33 | 32 | 34 | 53 | 32 | 34 | 33 | 32 | 32 | | |
| 53. Solids, Dissolved (mg/l) | 865 | 946 | 915 | 921 | 919 | 950 | 1160 | 927 | 963 | 936 | 953 | 956 | | |
| 54. Solids, Suspended | | | | | | | | | | | | | | |
| (*)55. Strontium (ug/l) | | | | | | | | | | | | | | |
| 56. Sulfate (mg/l) | 330 | 380 | 360 | 350 | 340 | 350 | 330 | 360 | 340 | 370 | 380 | 370 | | |
| 57. Sulfide | | | | | | | | .0 | .2 | .7 | .2 | .1 | | |
| 58. Temperature (°C) | 10.0 | 10.5 | 8.0 | 9.0 | 8.0 | 8.0 | 6.0 | 5.0 | 1.0 | 6.0 | 4.5 | 6.0 | | |
| (*)59. Tin (ug/l) | | | | | | | | | | | | | | |
| (*)60. Titanium (ug/l) | | | | | | | | | | | | | | |
| 61. Turbidity | | | | | | | | 30 | 10 | 3 | 8 | 5 | | |
| (*)62. Vanadium (ug/l) | | | | | | | | | | | | | | |
| 63. Zinc (ug/l) | 20 | 40 | 20 | 20 | 30 | 90 | 370 | 30 | 20 | 20 | 20 | 20 | | |
| 64. Zirconium (ug/l) | | | | | | | | | | | | | | |
| 65. Calcium (mg/l) | 73 | 98 | 96 | 95 | 99 | 99 | 89 | 99 | 96 | 97 | 93 | 98 | | |
| 66. Complete Element Scan | | | | | | | | | | | | | | |
| 67. Radioactivity | | | | | | | | | | | | | | |
| Gross Alpha (pcl) | | | | | | | | | | | | | | |
| Radium 226* | | | | | | | | | | | | | | |
| Gross Beta | | | | | | | | | | | | | | |
| Thorium 230** | | | | | | | | | | | | | | |
| Uranium ** | | | | | | | | | | | | | | |
| 68. Total Organic Carbon (TOC) | | | | | | | | | | | | | | |
| If TOC > 10 mg/liter, then | | | | | | | | | | | | | | |
| Nitrogen (Base Extraction) | | | | | | | | | | | | | | |
| Organic Carbon, Dissolved | | | | | | | | | | | | | | |
| Organic Carbon, Suspended | | | | | | | | | | | | | | |
| Phenols | | | | | | | | | | | | | | |
| Sulfur (Acid Extraction) | | | | | | | | | | | | | | |

(*) Not Required

* Required if Gross Alpha > 4 picocuries per liter (pcl)
** Required if Gross Beta > 100 picocuries per liter (pcl)

N Non-Instantaneous Discharge

NOTE: A number preceded by a less than (<) sign represents the lowest detectable limit for the analytical method used for that particular sample run. Analytical method and thus lower limit may change across sample runs even for a single element.

# TABLE II-A-3
## WEST FORK STEWART GULCH NEAR RIO BLANCO
## U.S.G.S. No. 09306025
## OCTOBER 1974 - FEBRUARY 1975

| | 10/3 | 10/9 | 10/16 | 10/23 | 10/30 | 11/6 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (*)1. Alkalinity (mg/l) | 460 | 428 | 413 | 444 | 393 | 400 | | | | | | | | |
| (*)2. Aluminum (ug/l) | | | | | | | | | | | | | | |
| 3. Aromatics, Polycyclic | | | | | | | | | | | | | | |
| 4. Arsenic (ug/l) | 2 | 1 | 1 | 1 | 0 | 1 | | | | | | | | |
| 5. Barium (ug/l) | 0 | 0 | <100 | 0 | <100 | <100 | | | | | | | | |
| (*)6. Beryllium (ug/l) | | | | | | | | | | | | | | |
| 7. Bicarbonate (mg/l) | 501 | 522 | 504 | 541 | 479 | 488 | | | | | | | | |
| (*)8. Bismuth (ug/l) | | | | | | | | | | | | | | |
| 9. Boron (ug/l) | 150 | 110 | 80 | 150 | 40 | 90 | | | | | | | | |
| 10. Cadmium (ug/l) | 0 | <1 | 0 | 0 | 0 | 1 | | | | | | | | |
| 11. Carbonate (mg/l) | | | | | | | | | | | | | | |
| (*)12. Carbon Dioxide (mg/l) | | | | | | | | | | | | | | |
| 13. Chloride (mg/l) | 19 | 11 | 10 | 11 | 12 | 9.4 | | | | | | | | |
| 14. Chromium (ug/l) | | | | | | | | | | | | | | |
| (*)15. Cobalt (ug/l) | | | | | | | | | | | | | | |
| 16. COD | | | | | | | | | | | | | | |
| 17. Coliform, Total & Fecal | | | | | | | | | | | | | | |
| 18. Color | | | | | | | | | | | | | | |
| 19. Conductivity, Specific (umho) | 1730 | 1590 | 1570 | 1620 | 1580 | 1460 | | | | | | | | |
| 20. Copper (ug/l) | 6 | 2 | 0 | 1 | 0 | 1 | | | | | | | | |
| 21. Cyanide (mg/l) | | | | | | | | | | | | | | |
| 22. Discharge (CFS) | -- | .03 | .07 | .06 | .15 | .13 | | | | | | | | |
| 23. Dissolved Oxygen | | | | | | | | | | | | | | |
| 24. Fluoride (mg/l) | .2 | .2 | .2 | .2 | .2 | .2 | | | | | | | | |
| (*)25. Gallium (ug/l) | | | | | | | | | | | | | | |
| (*)26. Germanium (ug/l) | | | | | | | | | | | | | | |
| (*)27. Hardness (Ca, Mg) (mg/l) | 590 | 580 | 610 | 620 | 530 | 550 | | | | | | | | |
| (*)28. Hardness, Non-Carbonate (mg/l) | 130 | 150 | 190 | 180 | 140 | 150 | | | | | | | | |
| 29. Iron (ug/l) | 40 | 60 | 20 | 20 | 30 | 210 | | | | | | | | |
| 30. Kjeldahl Nitrogen | | | | | | | | | | | | | | |
| 31. Lead (ug/l) | 1 | 3 | 3 | 0 | 1 | 3 | | | | | | | | |
| 32. Lithium (ug/l) | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | |
| 33. Magnesium (mg/l) | 96 | 94 | 90 | 91 | 100 | 81 | | | | | | | | |
| 34. Magnanese (ug/l) | 0 | 0 | 0 | 10 | 0 | 0 | | | | | | | | |
| 35. Mercury (ug/l) | .0 | .0 | .0 | .0 | .0 | .0 | | | | | | | | |
| (*)36. Molybdenum (ug/l) | | | | | | | | | | | | | | |
| (*)37. Nickel (ug/l) | | | | | | | | | | | | | | |
| 38. Nitrate (mg/l) | .02 | .02 | .02 | .01 | .08 | .12 | | | | | | | | |
| 39. Nitrite (mg/l) | | | | | | | | | | | | | | |
| 40. Odor | | | | | | | | | | | | | | |
| 41. Oil & Grease | | | | | | | | | | | | | | |
| 42. Ortho-Phosphate (mg/l) | .03 | .03 | .00 | .00 | .03 | .06 | | | | | | | | |
| (*)43. Ortho-Phosphorus (mg/l) | .01 | .01 | .00 | .00 | .01 | .02 | | | | | | | | |
| 44. Pesticides | | | | | | | | | | | | | | |
| 45. pH | | | | | | | | | | | | | | |
| 46. Potassium (mg/l) | 6.4 | 1.9 | 4.1 | 4.5 | 4.9 | 3.1 | | | | | | | | |
| 47. Selenium (ug/l) | 0 | 0 | 0 | 0 | 0 | 5 | | | | | | | | |
| 48. Silica (mg/l) | 14 | 14 | 13 | 14 | 14 | 13 | | | | | | | | |
| (*)49. Silver (ug/l) | | | | | | | | | | | | | | |
| 50. Sodium (mg/l) | 180 | 150 | 150 | 160 | 160 | 130 | | | | | | | | |
| (*)51. Sodium Adsorption Ratio | 3.2 | 2.7 | 2.7 | 2.8 | 3.0 | 2.4 | | | | | | | | |
| (*)52. Sodium (%) | 40 | 36 | 35 | 35 | 39 | 34 | | | | | | | | |
| 53. Solids, Dissolved (mg/l) | 1150 | 1040 | 1090 | 1120 | 1030 | 943 | | | | | | | | |
| 54. Solids, Suspended | | | | | | | | | | | | | | |
| (*)55. Strontium (ug/l) | | | | | | | | | | | | | | |
| 56. Sulfate (mg/l) | 480 | 430 | 480 | 470 | 450 | 380 | | | | | | | | |
| 57. Sulfide | | | | | | | | | | | | | | |
| 58. Temperature (°C) | 11.0 | 12.0 | 14.0 | 7.0 | 5.0 | 13.5 | | | | | | | | |
| (*)59. Tin (ug/l) | | | | | | | | | | | | | | |
| (*)60. Titanium (ug/l) | | | | | | | | | | | | | | |
| 61. Turbidity | | | | | | | | | | | | | | |
| (*)62. Vanadium (ug/l) | | | | | | | | | | | | | | |
| 63. Zinc (ug/l) | 20 | 40 | 20 | 10 | 20 | 40 | | | | | | | | |
| 64. Zirconium (ug/l) | | | | | | | | | | | | | | |
| 65. Calcium (mg/l) | 77 | 77 | 94 | 100 | 48 | 82 | | | | | | | | |
| 66. Complete Element Scan | | | | | | | | | | | | | | |
| 67. Radioactivity | | | | | | | | | | | | | | |
| Gross Alpha (pci) | | | | | | | | | | | | | | |
| Radium 226* | | | | | | | | | | | | | | |
| Gross Beta | | | | | | | | | | | | | | |
| Thorium 230** | | | | | | | | | | | | | | |
| Uranium ** | | | | | | | | | | | | | | |
| 68. Total Organic Carbon (TOC) | | | | | | | | | | | | | | |
| If TOC > 10 mg/liter, then | | | | | | | | | | | | | | |
| Nitrogen (Base Extraction) | | | | | | | | | | | | | | |
| Organic Carbon, Dissolved | | | | | | | | | | | | | | |
| Organic Carbon, Suspended | | | | | | | | | | | | | | |
| Phenols | | | | | | | | | | | | | | |
| Sulfur (Acid Extraction) | | | | | | | | | | | | | | |

(*) Not Required

* Required if Gross Alpha > 4 picocuries per liter (pci)
** Required if Gross Beta > 100 picocuries per liter (pci)

N Non-Instantaneous Discharge

NOTE: A number preceded by a less than (<) sign represents the lowest detectable limit for the analytical method used for that particular sample run. Analytical method and thus lower limit may change across sample runs even for a single element.

# TABLE II-A-4
# COTTONWOOD GULCH NEAR RIO BLANCO
## U.S.G.S. No. 09306039
## DECEMBER 1974

| | 12/5/74 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (*)1. Alkalinity (mg/l) | 402 | | | | | | | | | | | | | |
| (*)2. Aluminum (ug/l) | 140 | | | | | | | | | | | | | |
| 3. Aromatics, Polycyclic | | | | | | | | | | | | | | |
| 4. Arsenic (ug/l) | 7 | | | | | | | | | | | | | |
| 5. Barium (ug/l) | 180 | | | | | | | | | | | | | |
| (*)6. Beryllium (ug/l) | <2 | | | | | | | | | | | | | |
| 7. Bicarbonate (mg/l) | 449 | | | | | | | | | | | | | |
| (*)8. Bismuth (ug/l) | <6 | | | | | | | | | | | | | |
| 9. Boron (ug/l) | 150 | | | | | | | | | | | | | |
| 10. Cadmium (ug/l) | <20 | | | | | | | | | | | | | |
| 11. Carbonate (mg/l) | 20 | | | | | | | | | | | | | |
| (*)12. Carbon Dioxide (mg/l) | 2.5 | | | | | | | | | | | | | |
| 13. Chloride (mg/l) | 30 | | | | | | | | | | | | | |
| 14. Chromium (ug/l) | <6 | | | | | | | | | | | | | |
| (*)15. Cobalt (ug/l) | <6 | | | | | | | | | | | | | |
| 16. COD | | | | | | | | | | | | | | |
| 17. Coliform, Total & Fecal | | | | | | | | | | | | | | |
| 18. Color | 20 | | | | | | | | | | | | | |
| 19. Conductivity, Specific (umho) | 1220 | | | | | | | | | | | | | |
| 20. Copper (ug/l) | 3 | | | | | | | | | | | | | |
| 21. Cyanide (mg/l) | .00 | | | | | | | | | | | | | |
| 22. Discharge (CFS) | .38 | | | | | | | | | | | | | |
| 23. Dissolved Oxygen | | | | | | | | | | | | | | |
| 24. Fluoride (mg/l) | 5.2 | | | | | | | | | | | | | |
| (*)25. Gallium (ug/l) | <3 | | | | | | | | | | | | | |
| (*)26. Germanium (ug/l) | <6 | | | | | | | | | | | | | |
| (*)27. Hardness (Ca, Mg) (mg/l) | 270 | | | | | | | | | | | | | |
| (*)28. Hardness, Non-Carbonate (mg/l) | 0 | | | | | | | | | | | | | |
| 29. Iron (ug/l) | 140 | | | | | | | | | | | | | |
| 30. Kjeldahl Nitrogen | .50 | | | | | | | | | | | | | |
| 31. Lead (ug/l) | <6 | | | | | | | | | | | | | |
| 32. Lithium (ug/l) | 20 | | | | | | | | | | | | | |
| 33. Magnesium (mg/l) | 34 | | | | | | | | | | | | | |
| 34. Magnanese (ug/l) | 5 | | | | | | | | | | | | | |
| 35. Mercury (ug/l) | <.1 | | | | | | | | | | | | | |
| (*)36. Molybdenum (ug/l) | 10 | | | | | | | | | | | | | |
| (*)37. Nickel (ug/l) | <4 | | | | | | | | | | | | | |
| 38. Nitrate (mg/l) | .22 | | | | | | | | | | | | | |
| 39. Nitrite (mg/l) | .01 | | | | | | | | | | | | | |
| 40. Odor | | | | | | | | | | | | | | |
| 41. Oil & Grease | 0 | | | | | | | | | | | | | |
| 42. Ortho-Phosphate (mg/l) | .06 | | | | | | | | | | | | | |
| (*)43. Ortho-Phosphorus (mg/l) | .02 | | | | | | | | | | | | | |
| 44. Pesticides | | | | | | | | | | | | | | |
| 45. pH | 8.5 | | | | | | | | | | | | | |
| 46. Potassium (mg/l) | 1.3 | | | | | | | | | | | | | |
| 47. Selenium (ug/l) | 4 | | | | | | | | | | | | | |
| 48. Silica (mg/l) | 17 | | | | | | | | | | | | | |
| (*)49. Silver (ug/l) | 0 | | | | | | | | | | | | | |
| 50. Sodium (mg/l) | 200 | | | | | | | | | | | | | |
| (*)51. Sodium Adsorption Ratio | 5.3 | | | | | | | | | | | | | |
| (*)52. Sodium (%) | 62 | | | | | | | | | | | | | |
| 53. Solids, Dissolved (mg/l) | 814 | | | | | | | | | | | | | |
| 54. Solids, Suspended | | | | | | | | | | | | | | |
| (*)55. Strontium (ug/l) | 3300 | | | | | | | | | | | | | |
| 56. Sulfate (mg/l) | 230 | | | | | | | | | | | | | |
| 57. Sulfide | .2 | | | | | | | | | | | | | |
| 58. Temperature (°C) | 5.0 | | | | | | | | | | | | | |
| (*)59. Tin (ug/l) | <6 | | | | | | | | | | | | | |
| (*)60. Titanium (ug/l) | 6 | | | | | | | | | | | | | |
| 61. Turbidity | 200 | | | | | | | | | | | | | |
| (*)62. Vanadium (ug/l) | <3.0 | | | | | | | | | | | | | |
| 63. Zinc (ug/l) | < 20 | | | | | | | | | | | | | |
| 64. Zirconium (ug/l) | < 11 | | | | | | | | | | | | | |
| 65. Calcium (mg/l) | 50 | | | | | | | | | | | | | |
| 66. Complete Element Scan | | | | | | | | | | | | | | |
| 67. Radioactivity | | | | | | | | | | | | | | |
| Gross Alpha (pcl) | | | | | | | | | | | | | | |
| Radium 226* | | | | | | | | | | | | | | |
| Gross Beta | | | | | | | | | | | | | | |
| Thorium 230** | | | | | | | | | | | | | | |
| Uranium ** | | | | | | | | | | | | | | |
| 68. Total Organic Carbon (TOC) | | | | | | | | | | | | | | |
| If TOC > 10 mg/liter, then | | | | | | | | | | | | | | |
| Nitrogen (Base Extraction) | | | | | | | | | | | | | | |
| Organic Carbon, Dissolved | | | | | | | | | | | | | | |
| Organic Carbon, Suspended | | | | | | | | | | | | | | |
| Phenols | | | | | | | | | | | | | | |
| Sulfur (Acid Extraction) | | | | | | | | | | | | | | |

(*) Not Required

* Required if Gross Alpha > 4 picocuries per liter (pcl)
** Required if Gross Beta > 100 picocuries per liter (pcl)

N Non-Instantaneous Discharge

NOTE: A number preceded by a less than (<) sign represents the lowest detectable limit for the analytical method used for that particular sample run. Analytical method and thus lower limit may change across sample runs even for a single element.

# TABLE II-A-5
# WILLOW CREEK NEAR RIO BLANCO
## U.S.G.S. No. 09306058
## OCTOBER 1974 - FEBRUARY 1975

| | 10/4 | 10/9 | 10/17 | 10/23 | 10/31 | 11/6 | 11/20 | 12/6 | 12/17 | 1/3/75 | 1/16 | 2/3 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (*)1. Alkalinity (mg/l) | 409 | 419 | 417 | 419 | 450 | 449 | 476 | 437 | 438 | 428 | 419 | 436 | | |
| (*)2. Aluminum (ug/l) | | | | | | | | 320 | | | | | | |
| 3. Aromatics, Polycyclic | | | | | | | | | | | | | | |
| 4. Arsenic (ug/l) | 1 | 2 | 1 | 1 | 1 | 0 | 2 | 1 | 1 | 0 | 1 | 4 | | |
| 5. Barium (ug/l) | 0 | 0 | <100 | 0 | <100 | <100 | <100 | 95 | <100 | <100 | 0 | 100 | | |
| (*)6. Beryllium (ug/l) | | | | | | | | <2 | | | | | | |
| 7. Bicarbonate (mg/l) | 499 | 511 | 509 | 511 | 549 | 548 | 580 | 533 | 531 | 522 | 511 | 531 | | |
| (*)8. Bismuth (ug/l) | | | | | | | | <6 | | | | | | |
| 9. Boron (ug/l) | 70 | 140 | 90 | 160 | 80 | 150 | 70 | 66 | 120 | 110 | 120 | 110 | | |
| 10. Cadmium (ug/l) | 0 | <1 | 0 | 0 | 0 | 1 | 0 | <20 | 1 | 0 | 0 | 1 | | |
| 11. Carbonate (mg/l) | | | | | | | | 0 | 0 | 0 | 0 | 0 | | |
| (*)12. Carbon Dioxide (mg/l) | | | | | | | | 5.4 | 1.7 | 8.4 | 6.5 | 27 | | |
| 13. Chloride (mg/l) | 10 | 11 | 9.9 | 10 | 11 | 10 | 11 | 11 | 11 | 10 | 9.5 | 12 | | |
| 14. Chromium (ug/l) | | | | | | | | <6 | <10 | 0 | 10 | 0 | | |
| (*)15. Cobalt (ug/l) | | | | | | | | <6 | | | | | | |
| 16. COD | | | | | | | | 35 | | | | | | |
| 17. Coliform, Total & Fecal | | | | | | | | | | | | | | |
| 18. Color | | | | | | | | 5 | 3 | 3 | 5 | 0 | | |
| 19. Conductivity, Specific (umho) | 1370 | 1390 | 1380 | 1400 | 1440 | 1460 | 1470 | 3500 | 1500 | 1200 | 1350 | 1500 | | |
| 20. Copper (ug/l) | 2 | 2 | 0 | 0 | 0 | 2 | 1 | 3 | 0 | 0 | 2 | 4 | | |
| 21. Cyanide (mg/l) | | | | | | | | .00 | .01 | .00 | .00 | .00 | | |
| 22. Discharge (CFS) | -- | .56 | .58 | .77 | -- | .93 | 1.4 | 3.3 | 2.8 | 2.4 | 2.5 | -- | | |
| 23. Dissolved Oxygen | | | | | | | | | | | | | | |
| 24. Fluoride (mg/l) | .4 | .4 | .4 | .5 | .4 | .2 | .4 | .3 | .4 | .4 | .4 | .3 | | |
| (*)25. Gallium (ug/l) | | | | | | | | <3 | | | | | | |
| (*)26. Germanium (ug/l) | | | | | | | | <6 | | | | | | |
| (*)27. Hardness (Ca, Mg) (mg/l) | 460 | 490 | 540 | 490 | 560 | 570 | 540 | 560 | 580 | 550 | 530 | 550 | | |
| (*)28. Hardness, Non-Carbonate (mg/l) | 51 | 74 | 130 | 69 | 110 | 120 | 68 | 120 | 140 | 120 | 110 | 120 | | |
| 29. Iron (ug/l) | 20 | 40 | 20 | 40 | 20 | 320 | 30 | 300 | 10 | | 40 | 10 | | |
| 30. Kjeldahl Nitrogen | | | | | | | | .39 | .20 | .25 | .48 | 1.0 | | |
| 31. Lead (ug/l) | 1 | 7 | 3 | 3 | 1 | 5 | 1 | <6 | 1 | 1 | 3 | 2 | | |
| 32. Lithium (ug/l) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 10 | 10 | 10 | 0 | | |
| 33. Magnesium (mg/l) | 73 | 76 | 72 | 70 | 76 | 77 | 72 | 74 | 79 | 76 | 70 | 74 | | |
| 34. Magnanese (ug/l) | 0 | 0 | 0 | 10 | 0 | 10 | 20 | 70 | 0 | 20 | 10 | 30 | | |
| 35. Mercury (ug/l) | .0 | .0 | .0 | .0 | .0 | .0 | .0 | <.1 | <.1 | .2 | .0 | .2 | | |
| (*)36. Molybdenum (ug/l) | | | | | | | | 3 | | | | | | |
| (*)37. Nickel (ug/l) | | | | | | | | <4 | | | | | | |
| 38. Nitrate (mg/l) | | | | | | | | .40 | .41 | .40 | .60 | .43 | | |
| 39. Nitrite (mg/l) | | | | | | | | .00 | .00 | .00 | .01 | .00 | | |
| 40. Odor | | | | | | | | | | | | | | |
| 41. Oil & Grease | | | | | | | | 4 | 1 | 7 | 6 | 5 | | |
| 42. Ortho-Phosphate (mg/l) | .09 | .09 | .03 | .03 | .03 | .03 | .03 | .09 | .03 | .03 | .06 | .15 | | |
| (*)43. Ortho-Phosphorus (mg/l) | .03 | .03 | .01 | .01 | .01 | .01 | .01 | .03 | .01 | .01 | .02 | .05 | | |
| 44. Pesticides | | | | | | | | | | | | | | |
| 45. pH | | | | | | | | 8.2 | 8.7 | 8.0 | 8.1 | 7.5 | | |
| 46. Potassium (mg/l) | 2.3 | 1.1 | 2.3 | 2.5 | 2.9 | 2.3 | 2.6 | 1.8 | 1.5 | 1.7 | 2.0 | 2.3 | | |
| 47. Selenium (ug/l) | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | | |
| 48. Silica (mg/l) | 17 | 18 | 17 | 18 | 15 | 8.2 | 17 | 16 | 16 | 15 | 16 | 17 | | |
| (*)49. Silver (ug/l) | | | | | | | | 0 | | | | | | |
| 50. Sodium (mg/l) | 130 | 140 | 120 | 130 | 130 | 130 | 140 | 120 | 120 | 120 | 120 | 120 | | |
| (*)51. Sodium Adsorption Ratio | 2.6 | 2.7 | 2.2 | 2.6 | 2.4 | 2.4 | 2.6 | 2.2 | 2.2 | 2.2 | 2.3 | 2.2 | | |
| (*)52. Sodium (%) | 38 | 38 | 32 | 37 | 33 | 33 | 36 | 32 | 31 | 32 | 33 | 32 | | |
| 53. Solids, Dissolved (mg/l) | 875 | 925 | 914 | 895 | 948 | 950 | 982 | 922 | 924 | 908 | 890 | 940 | | |
| 54. Solids, Suspended | | | | | | | | | | | | | | |
| (*)55. Strontium (ug/l) | | | | | | | | 3500 | | | | | | |
| 56. Sulfate (mg/l) | 330 | 350 | 340 | 330 | 340 | 330 | 350 | 330 | 330 | 330 | 320 | 350 | | |
| 57. Sulfide | | | | | | | | .2 | .5 | .1 | .1 | .1 | | |
| 58. Temperature (°C) | 11.5 | 14.0 | 8.0 | 11.0 | 6.5 | 9.0 | 8.5 | | 3.7 | .0 | 3.5 | 3.5 | | |
| (*)59. Tin (ug/l) | | | | | | | | <6 | | | | | | |
| (*)60. Titanium (ug/l) | | | | | | | | 10 | | | | | | |
| 61. Turbidity | | | | | | | | 70 | 30 | 9 | 40 | 30 | | |
| (*)62. Vanadium (ug/l) | | | | | | | | <3.0 | | | | | | |
| 63. Zinc (ug/l) | 10 | 10 | 30 | 10 | 20 | 10 | 20 | 20 | 10 | 20 | 20 | 30 | | |
| 64. Zirconium (ug/l) | | | | | | | | <13 | | | | | | |
| 65. Calcium (mg/l) | 64 | 72 | 99 | 80 | 100 | 100 | 99 | 100 | 100 | 95 | 97 | 100 | | |
| 66. Complete Element Scan | | | | | | | | | | | | | | |
| 67. Radioactivity | | | | | | | | | | | | | | |
| Gross Alpha (pcl) | | | | | | | | | | | | | | |
| Radium 226* | | | | | | | | | | | | | | |
| Gross Beta | | | | | | | | | | | | | | |
| Thorium 230** | | | | | | | | | | | | | | |
| Uranium ** | | | | | | | | | | | | | | |
| 68. Total Organic Carbon (TOC) | | | | | | | | | | | | | | |
| If TOC > 10 mg/liter, then | | | | | | | | | | | | | | |
| Nitrogen (Base Extraction) | | | | | | | | | | | | | | |
| Organic Carbon, Dissolved | | | | | | | | | | | | | | |
| Organic Carbon, Suspended | | | | | | | | | | | | | | |
| Phenols | | | | | | | | | | | | | | |
| Sulfur (Acid Extraction) | | | | | | | | | | | | | | |

(*) Not Required

* Required if Gross Alpha > 4 picocuries per liter (pcl)
** Required if Gross Beta > 100 picocuries per liter (pcl)

N Non-Instantaneous Discharge

NOTE: A number preceded by a less than (<) sign represents the lowest detectable limit for the analytical method used for that particular sample run. Analytical method and thus lower limit may change across sample runs even for a single element.

## TABLE II-A-6
## PICEANCE CREEK Ab HUNTER CREEK, Nr RIO BLANCO
## U.S.G.S. No. 09306061
## OCTOBER 1974 - FEBRUARY 1975

| | 10/4 | 10/17 | 10/24 | 10/31 | 11/6 | 11/20 | 12/6 | 12/18 | 1/3/75 | 1/16 | 2/3 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (*)1. Alkalinity (mg/l) | 504 | 502 | 512 | 544 | 509 | 470 | 465 | 453 | 459 | 447 | 485 | | | |
| (*)2. Aluminum (ug/l) | | | | | | | | | | | | | | |
| 3. Aromatics, Polycyclic | | | | | | | | | | | | | | |
| 4. Arsenic (ug/l) | 2 | 2 | 2 | 1 | 2 | 4 | 3 | 2 | 0 | 1 | 5 | | | |
| 5. Barium (ug/l) | 0 | <100 | 0 | <100 | <100 | <100 | <100 | <100 | <100 | 0 | <100 | | | |
| (*)6. Beryllium (ug/l) | | | | | | | | | | | | | | |
| 7. Bicarbonate (mg/l) | 615 | 612 | 661 | 663 | 620 | 573 | 565 | 552 | 559 | 545 | 591 | | | |
| (*)8. Bismuth (ug/l) | | | | | | | | | | | | | | |
| 9. Boron (ug/l) | 270 | 200 | 230 | 170 | 220 | 200 | 220 | 160 | 170 | 180 | 150 | | | |
| 10. Cadmium (ug/l) | 0 | 0 | 0 | 0 | 5 | 0 | 1 | 2 | 0 | 1 | 1 | | | |
| 11. Carbonate (mg/l) | | | | | | | 0 | 0 | 0 | 0 | 0 | | | |
| (*)12. Carbon Dioxide (mg/l) | | | | | | | 4.5 | 4.4 | 3.6 | 6.9 | 30 | | | |
| 13. Chloride (mg/l) | 14 | 14 | 14 | 15 | 15 | 13 | 12 | 12 | 13 | 12 | 13 | | | |
| 14. Chromium (ug/l) | | | | | | | 0 | 0 | 0 | 10 | 10 | | | |
| (*)15. Cobalt (ug/l) | | | | | | | | | | | | | | |
| 16. COD | | | | | | | 12 | | | | | | | |
| 17. Coliform, Total & Fecal | | | | | | | | | | | | | | |
| 18. Color | | | | | | | 5 | 5 | 5 | 0 | -- | | | |
| 19. Conductivity, Specific (umr) | 1500 | 1170 | 1550 | 1560 | 1490 | 1340 | 1220 | 1400 | 1000 | 1390 | 1300 | | | |
| 20. Copper (ug/l) | 4 | 0 | 2 | 2 | 2 | 0 | 2 | 1 | 2 | 2 | 3 | | | |
| 21. Cyanide (mg/l) | | | | | | | .00 | .00 | .00 | .00 | .00 | | | |
| 22. Discharge (CFS) | -- | 6.3 | 6.2 | -- | 5.6 | -- | 19 | 35 | -- | 14 | -- | | | |
| 23. Dissolved Oxygen | | | | | | | | | | | | | | |
| 24. Fluoride (mg/l) | .7 | .6 | .6 | .7 | .6 | .7 | .6 | .7 | .7 | .7 | .6 | | | |
| (*)25. Gallium (ug/l) | | | | | | | | | | | | | | |
| (*)26. Germanium (ug/l) | | | | | | | | | | | | | | |
| (*)27. Hardness (Ca, Mg) (mg/l) | 430 | 490 | 530 | 560 | 520 | 450 | 490 | 460 | 500 | 460 | 500 | | | |
| (*)28. Hardness, Non-Carbonate (mg/l) | 0 | 0 | 0 | 11 | 13 | 0 | 26 | 8 | 39 | 14 | 11 | | | |
| 29. Iron (ug/l) | 10 | 30 | 30 | 10 | 460 | 10 | 110 | 10 | 10 | 10 | 30 | | | |
| 30. Kjeldahl Nitrogen | | | | | | | 1.4 | .58 | .93 | .52 | .46 | | | |
| 31. Lead (ug/l) | 0 | .3 | 2 | 0 | 5 | 2 | 1 | 2 | 3 | 6 | 2 | | | |
| 32. Lithium (ug/l) | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 10 | 10 | 10 | 10 | | | |
| 33. Magnesium (mg/l) | 69 | 69 | 78 | 82 | 75 | 60 | 66 | 61 | 68 | 64 | 67 | | | |
| 34. Magnanese (ug/l) | 0 | 150 | 170 | 140 | 150 | 60 | 40 | 30 | 30 | 20 | 40 | | | |
| 35. Mercury (ug/l) | .0 | .0 | .0 | .0 | .0 | .0 | <.1 | <.1 | .0 | .0 | .1 | | | |
| (*)36. Molybdenum (ug/l) | | | | | | | | | | | | | | |
| (*)37. Nickel (ug/l) | | | | | | | | | | | | | | |
| 38. Nitrate (mg/l) | .31 | .29 | .27 | .19 | .18 | .55 | .64 | .79 | .73 | .77 | .68 | | | |
| 39. Nitrite (mg/l) | | | | | | | .01 | .00 | .00 | .01 | .01 | | | |
| 40. Odor | | | | | | | | | | | | | | |
| 41. Oil & Grease | | | | | | | 8 | 3 | 9 | 7 | 8 | | | |
| 42. Ortho-Phosphate (mg/l) | .18 | .09 | .12 | .09 | .03 | .03 | .06 | .03 | .09 | .06 | .25 | | | |
| 43. Ortho-Phosphorus (mg/l) | .06 | .03 | .04 | .03 | .01 | .01 | .02 | .01 | .03 | .02 | .08 | | | |
| 44. Pesticides | | | | | | | | | | | | | | |
| 45. pH | | | | | | | 8.3 | 8.3 | 8.4 | 8.1 | 7.5 | | | |
| 46. Potassium (mg/l) | 1.2 | 3.8 | 4.3 | 3.5 | 4.0 | 3.0 | 2.6 | 2.5 | 2.8 | 2.6 | 2.7 | | | |
| 47. Selenium (ug/l) | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | | | |
| 48. Silica (mg/l) | 20 | 19 | 19 | 19 | 17 | 17 | 16 | 19 | 16 | 17 | 17 | | | |
| (*)49. Silver (ug/l) | | | | | | | | | | | | | | |
| 50. Sodium (mg/l) | 180 | 180 | 170 | 180 | 170 | 150 | 140 | 140 | 140 | 140 | 110 | | | |
| (*)51. Sodium Adsorption Ratio | 3.8 | 3.5 | 3.2 | 3.3 | 3.2 | 3.1 | 2.8 | 2.8 | 2.7 | 2.8 | 2.7 | | | |
| (*)52. Sodium (%) | 48 | 44 | 41 | 41 | 41 | 42 | 38 | 40 | 38 | 40 | 38 | | | |
| 53. Solids, Dissolved (mg/l) | 949 | 992 | 1030 | 1050 | 1000 | 870 | 887 | 886 | 907 | 878 | 944 | | | |
| 54. Solids, Suspended | | | | | | | | | | | | | | |
| (*)55. Strontium (ug/l) | | | | | | | | | | | | | | |
| 56. Sulfate (mg/l) | 300 | 320 | 330 | 330 | 330 | 260 | 280 | 290 | 300 | 290 | 320 | | | |
| 57. Sulfide | | | | | | | .2 | .5 | .0 | .0 | .2 | | | |
| 58. Temperature (°C) | 14.0 | 14.0 | 10.0 | 8.0 | 10.0 | 6.5 | 5.0 | 2.5 | .0 | 1.0 | .0 | | | |
| (*)59. Tin (ug/l) | | | | | | | | | | | | | | |
| (*)60. Titanium (ug/l) | | | | | | | | | | | | | | |
| 61. Turbidity | | | | | | | 80 | 40 | 20 | 30 | 10 | | | |
| (*)62. Vanadium (ug/l) | | | | | | | | | | | | | | |
| 63. Zinc (ug/l) | 10 | 10 | 20 | 0 | 10 | 10 | 30 | 0 | 10 | 30 | 30 | | | |
| 64. Zirconium (ug/l) | | | | | | | | | | | | | | |
| 65. Calcium (mg/l) | 89 | 82 | 83 | 87 | 85 | 81 | 87 | 84 | 87 | 79 | 88 | | | |
| 66. Complete Element Scan | | | | | | | | | | | | | | |
| 67. Radioactivity | | | | | | | | | | | | | | |
| Gross Alpha (pcl) | | | | | | | | | | | | | | |
| Radium 226* | | | | | | | | | | | | | | |
| Gross Beta | | | | | | | | | | | | | | |
| Thorium 230** | | | | | | | | | | | | | | |
| Uranium ** | | | | | | | | | | | | | | |
| 68. Total Organic Carbon (TOC) | | | | | | | | | | | | | | |
| If TOC > 10 mg/liter, then | | | | | | | | | | | | | | |
| Nitrogen (Base Extraction) | | | | | | | | | | | | | | |
| Organic Carbon, Dissolved | | | | | | | | | | | | | | |
| Organic Carbon, Suspended | | | | | | | | | | | | | | |
| Phenols | | | | | | | | | | | | | | |
| Sulfur (Acid Extraction) | | | | | | | | | | | | | | |

(*) Not Required

* Required if Gross Alpha > 4 picocuries per liter (pcl)
** Required if Gross Beta > 100 picocuries per liter (pcl)

N Non-Instantaneous Discharge

NOTE: A number preceded by a less than (<) sign represents the lowest detectable limit for the analytical method used for that particular sample run. Analytical method and thus lower limit may change across sample runs even for a single element.

NEW YORK ☐
DENVER ☒
LOS ANGELES ☐

THE OIL SHALE CORPORATION

INTER OFFICE MEMORANDUM

LABORATORY DATA LETTER 75-24

FROM: F. C. Haas
TO: File

DATE: February 12, 1975
FILE NO.: 5100-3
SUBJECT: Total Organic Carbon Analysis on C-b Surface Waters Project No. 197

Five surface water samples were submitted by the USGS (delivered by J. Matis) for total organic carbon (TOC) analysis. Analysis was done by Commercial Testing & Engineering, Golden, Colorado. Analytical reports are attached. Four of the samples contained less than 1 mg/liter TOC. One sample, No. 09306039 contained 27 mg/liter TOC. After filtering on 0.45 micron filter paper, the sample contained 3 mg/liter DOC (dissolved organic carbon).

TOSCO Rocky Flats then did an organic extraction to separate acids, bases, phenols and neutral oils. A portion of the same sample was filtered through Whatman No. 1 to remove the sand and the organic extraction was made on the filtrate. A total of only 1.2 mg/liter organic material was extracted. The sand portion was then extracted and an equivalent of an additional 0.3 mg/liter was recovered for a total of 1.5 mg/liter organic material.

Two possible explanations for the discrepancy between TOC and extractable organics is that the organics may boil below about 80°C or the organic material is highly water soluble, e.g., starches, sugars or humates. In the extraction scheme choloroform is used as the solvent and is subsequently evaporated off at approximately 40°C under vacuum.

No further work is planned.

FCH/aw
Encs.

Approved (MTA)

cc: Messrs. Vawter, Spence, Schulman, Cleveland, Schillinger, Legatski (ARCO), Matis (ARCO) and Tait (ARCO)

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434

SINCE 1908

Reply to
Instrumental Analysis Division
14335 West 44th Avenue
Golden, Colorado 80401

Phone: 303-278-9521

14 January 75

Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, Colorado 80401

Re: IAD #97-199-002-05

Analytical Report

| | | TOC *<br>mg/liter |
|---|---|---|
| 09306007 | 12/10/74 @ 11:10 temp 3.0°C | <1 |
| 09306039 | 12/10/74 @ 14:00 temp unk G.H. 1.45 | ~~<1~~ 27 |
| 09306061 | 12/10/74 @ 13:00 temp 6.0° G.H. 1.70 | ~~27~~ <1 |
| 09306058 | 12/10/74 @ 12:30 temp 5.0° G.H. Well frozen | <1 |
| 09306028 | 12/10/74 @ 11:00 temp 2.0° G.H. 1.22 | <1 |

* Test performed on sample marked "Regular" by an Outside Laboratory.

M L Jacobs
M. L. Jacobs, Ph.D.
Analyist

MLJ/dh

RECEIVED
JAN 17 1975
TOSCO/GOLDEN

CABLE ADDRESS COMTE

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434

SINCE 1908

Reply to
Instrumental Analysis Division
14335 West 44th Avenue
Golden, Colorado 80401

Phone: 303-278-9521

29 January 75

Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, Colorado 80401

Re: IAD #97-199-002-05

Analytical Report

As per your instruction, any sample that was greater than 10 mg/liter, TOC was to be rerun for DOC.

| | | DOC mg/liter |
|---|---|---|
| 09306039 | 12/10/74 @ 14:00 temp unk G.H. 1.45 | 3 |

Please note sample correction:

| | | TOC mg/liter |
|---|---|---|
| 09306039 | 12/10/74 @ 14:00 temp unk G.H, 1.45 | 27 |
| 09306061 | 12/10/74 @ 13:00 temp 6.0°G.H. 1.70 | <1 |

M. L. Jacobs, Ph.D
Divisional Manager

MLJ/dh

RECEIVED
JAN 30 1975
TOSCO/GOLDEN

CHICAGO, IL • CHARLESTON, WV • CLARKSBURG, WV • CLEVELAND, OH • NORFOLK, VA • TERRE HAUTE, IN • HENDERSON, KY • DENVER, CO • BIRMINGHAM, AL • VANCOUVER, B.C. CAN.

PROCESS DATE 02/03/75

09306007 - PICEANCE CREEK BELOW RIO BLANCO, CO.          DISTRICT CODE 08

WATER QUALITY DATA

| DATE | TIME | TYPE | SAMPLE NUMBER (00008) | TEMPER-ATURE (DEG C) (00010) | DIS-CHARGE (CFS) (00060) | INSTAN-TANEOUS DIS-CHARGE (CFS) (00061) | TUR-BID-ITY (JTU) (00070) | COLOR (PLAT-INUM-COBALT UNITS) (00080) | SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS) (00095) | CHEM-ICAL OXYGEN DEMAND (HIGH LEVEL) (MG/L) (00340) | PH (UNITS) (00400) | CARBON DIOXIDE (CO2) (MG/L) (00405) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 23... | 1230 | 2 | -- | 10.0 | -- | 25 | -- | -- | 977 | -- | 8.2 | 4.6 |
| MAY | | | | | | | | | | | | |
| 02... | 1100 | 2 | -- | 7.5 | -- | 34 | -- | -- | 912 | -- | 8.2 | 4.4 |
| 17... | 1130 | 2 | -- | 9.0 | 12 | -- | -- | -- | 1090 | -- | 8.2 | 5.2 |
| 22... | 1100 | 2 | 1861 | 11.0 | -- | 6.6 | -- | -- | 1240 | -- | 8.1 | 7.6 |
| 31... | 1230 | 2 | -- | 15.0 | -- | 6.4 | -- | -- | 1220 | -- | 8.3 | 4.8 |
| JUNE | | | | | | | | | | | | |
| 14... | 1215 | 2 | -- | 19.0 | 6.9 | -- | -- | -- | 1190 | -- | 8.2 | 5.9 |
| 21... | -- | 2 | -- | 19.0 | -- | 7.0 | -- | -- | 1200 | -- | 8.2 | 5.8 |
| 26... | 1030 | 2 | -- | 16.0 | 7.3 | -- | -- | -- | 1270 | -- | 8.3 | 4.7 |
| JULY | | | | | | | | | | | | |
| 02... | 0900 | 2 | -- | 10.5 | -- | 6.4 | -- | -- | 1250 | -- | 8.2 | 6.2 |
| 11... | 1530 | 2 | -- | 22.0 | -- | 4.0 | -- | -- | 1250 | -- | 8.1 | 7.5 |
| 26... | 1445 | 2 | -- | 20.0 | -- | 14 | -- | -- | 1030 | -- | 7.8 | 11 |
| AUG. | | | | | | | | | | | | |
| [illegible] | 0915 | 2 | -- | 13.0 | 8.0 | -- | -- | -- | 1210 | -- | 8.1 | 7.6 |
| [illegible] | 1240 | 2 | -- | 14.0 | 28 | -- | -- | -- | 1020 | -- | 8.2 | 5.0 |
| 15... | 1600 | 2 | -- | 21.0 | -- | 7.4 | -- | -- | 1010 | -- | -- | -- |
| 31... | 1530 | 2 | -- | 19.5 | -- | 8.4 | -- | -- | -- | -- | 6.9 | -- |
| SEP. | | | | | | | | | | | | |
| [illegible] | 1300 | 2 | -- | 8.0 | -- | 7.1 | -- | -- | 1080 | -- | -- | -- |
| 27... | 1100 | 2 | -- | 7.0 | -- | 8.1 | -- | -- | 1060 | -- | -- | -- |
| OCT. | | | | | | | | | | | | |
| 04... | 1320 | 2 | -- | 13.0 | -- | -- | -- | -- | 1140 | -- | -- | -- |
| 09... | 1240 | 2 | -- | 14.0 | -- | 2.9 | -- | -- | 1190 | -- | -- | -- |
| 15... | 1420 | 2 | -- | 13.0 | -- | 4.1 | -- | -- | 1160 | -- | -- | -- |
| 23... | 1300 | 2 | -- | 11.0 | -- | 5.3 | -- | -- | 1160 | -- | -- | -- |
| 31... | 1000 | 2 | -- | 5.0 | -- | -- | -- | -- | 1180 | -- | -- | -- |
| NOV. | | | | | | | | | | | | |
| [illegible] | 1000 | 2 | -- | 5.0 | -- | 6.0 | -- | -- | 1200 | -- | -- | -- |
| 21... | 1200 | 2 | -- | 4.0 | -- | 9.5 | -- | -- | 1040 | -- | 8.0 | 8.4 |
| DEC. | | | | | | | | | | | | |
| 14... | 1340 | 2 | -- | 4.0 | -- | 9.8 | 20 | 5 | 1070 | 9 | 8.2 | 5.2 |

PROCESS DATE 02/03/75
09306007 - PICEANCE CREEK BELOW RIO BLANCO, CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | CYANIDE (CN) (MG/L) (00720) | DIS-SOL-VED SUL-FIDE (S) (MG/L) (00745) | HARD-NESS (CA,MG) (MG/L) (00900) | NON-CAR-BONATE HARD-NESS (MG/L) (00902) | DIS-SOLVED CAL-CIUM (CA) (MG/L) (00915) | DIS-SOLVED MAG-NE-SIUM (MG) (MG/L) (00925) | DIS-SOLVED SODIUM (NA) (MG/L) (00930) | SODIUM AD-SORP-TION RATIO (00931) | PERCENT SODIUM (00932) | DIS-SOLVED PO-TAS-SIUM (K) (MG/L) (00935) | DIS-SOLVED CHLO-RIDE (CL) (MG/L) (00940) | DIS-SOLVED SULFATE (SO4) (MG/L) (00945) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 23... | -- | -- | 340 | 0 | 69 | 40 | 96 | 2.3 | 38 | 2.7 | 13 | 160 |
| MAY | | | | | | | | | | | | |
| 03... | -- | -- | 320 | 0 | 66 | 38 | 88 | 2.1 | 37 | 3.1 | 9.7 | 140 |
| 17... | -- | -- | 380 | 0 | 74 | 47 | 110 | 2.5 | 38 | 3.4 | 12 | 180 |
| 22... | -- | -- | 410 | 0 | 77 | 52 | 140 | 3.0 | 43 | 2.9 | 15 | 190 |
| 31... | -- | -- | 410 | 0 | 76 | 53 | 140 | 3.0 | 42 | 4.3 | 17 | 180 |
| JUNE | | | | | | | | | | | | |
| 14... | -- | -- | 400 | 0 | 73 | 52 | 150 | 3.3 | 45 | 3.7 | 15 | 180 |
| 21... | -- | -- | 390 | 0 | 76 | 49 | 140 | 3.1 | 44 | 3.4 | 17 | 180 |
| 26... | -- | -- | 400 | 0 | 76 | 50 | 150 | 3.3 | 45 | 4.1 | 16 | 180 |
| JULY | | | | | | | | | | | | |
| 02... | -- | -- | 420 | 0 | 74 | 56 | 150 | 3.2 | 44 | 3.5 | 16 | 190 |
| 11... | -- | -- | 410 | 0 | 72 | 57 | 160 | 3.4 | 45 | 3.8 | 17 | 200 |
| 20... | -- | -- | 340 | 0 | 73 | 39 | 110 | 2.6 | 41 | 5.7 | 16 | 190 |
| AUG. | | | | | | | | | | | | |
| 03... | -- | -- | 390 | 0 | 75 | 48 | 140 | 3.1 | 44 | 3.9 | 16 | 190 |
| 10... | -- | -- | 350 | 0 | 69 | 42 | 110 | 2.6 | 41 | 3.4 | 13 | 170 |
| 16... | -- | -- | 340 | 0 | 65 | 42 | 120 | 2.9 | 44 | 2.4 | 13 | 150 |
| 31... | -- | -- | 320 | -- | 51 | 47 | 130 | 3.2 | 46 | 4.3 | 15 | 150 |
| SEP. | | | | | | | | | | | | |
| 20... | -- | -- | 380 | 0 | 70 | 50 | 120 | 2.7 | 40 | 4.2 | 15 | 160 |
| 27... | -- | -- | 340 | 0 | 63 | 44 | 110 | 2.6 | 41 | 3.2 | 13 | 150 |
| OCT. | | | | | | | | | | | | |
| 04... | -- | -- | 370 | 0 | 69 | 49 | 140 | 3.2 | 45 | 2.8 | 16 | 170 |
| 09... | -- | -- | 350 | 0 | 69 | 43 | 150 | 3.5 | 48 | 3.1 | 17 | 170 |
| 16... | -- | -- | 360 | 0 | 70 | 50 | 140 | 3.1 | 44 | 3.3 | 16 | 170 |
| 23... | -- | -- | 360 | 0 | 68 | 46 | 130 | 3.0 | 44 | 3.5 | 16 | 170 |
| 31... | -- | -- | 400 | 0 | 76 | 50 | 140 | 3.1 | 43 | 3.8 | 15 | 170 |
| NOV. | | | | | | | | | | | | |
| 06... | -- | -- | 360 | 0 | 75 | 42 | 140 | 3.2 | 46 | 3.3 | 16 | 160 |
| 20... | -- | -- | 350 | 0 | 71 | 42 | 130 | 3.0 | 44 | 2.9 | 15 | 160 |
| DEC. | | | | | | | | | | | | |
| 04... | .00 | .0 | 330 | 0 | 58 | 45 | 120 | 2.9 | 44 | 2.4 | 13 | 150 |

09306007 - PICEANCE CREEK BELOW RIO BLANCO, CO.

PROCESS DATE 02/03/75
DISTRICT CODE 08

WATER QUALITY DATA

| DATE | DIS-SOLVED LITHIUM (LI) (UG/L) (01130) | DIS-SOLVED SELE-NIUM (SE) (UG/L) (01145) | DIS-SOLVED TI-TANIUM (TI) (UG/L) (01150) | DIS-SOLVED ZIR-CONIUM (ZR) (UG/L) (01160) | DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L) (70301) | DIS-SOLVED SOLIDS (TONS PER DAY) (70302) | DIS-SOLVED SOLIDS (TONS PER AC-FT) (70303) | TOTAL ORTHO PHOS-PHORUS (P) (MG/L) (70507) | DIS-SOLVED AMMONIA (NH4) (MG/L) (71846) |
|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | |
| 23... | -- | -- | -- | -- | 625 | 43.5 | .85 | -- | -- |
| MAY | | | | | | | | | |
| 03... | -- | -- | -- | -- | 578 | 53.7 | .79 | -- | -- |
| 17... | -- | 0 | -- | -- | 701 | 22.7 | .95 | -- | -- |
| 22... | 10 | 2 | <8 | <24 | 792 | 14.2 | 1.08 | -- | -- |
| 31... | 10 | 1 | -- | -- | 786 | 13.6 | 1.07 | -- | -- |
| JUNE | | | | | | | | | |
| 14... | 10 | 1 | -- | -- | 776 | 14.5 | 1.06 | -- | -- |
| 21... | 10 | 1 | -- | -- | 764 | 14.4 | 1.04 | -- | -- |
| 26... | 10 | 0 | -- | -- | 783 | 15.4 | 1.05 | -- | -- |
| JULY | | | | | | | | | |
| 02... | 0 | 1 | -- | -- | 809 | 14.1 | 1.10 | -- | -- |
| 11... | 0 | 1 | -- | -- | 829 | 9.04 | 1.13 | -- | -- |
| 23... | 0 | 0 | -- | -- | 670 | 25.4 | .91 | -- | -- |
| AUG. | | | | | | | | | |
| 03... | 0 | 1 | -- | -- | 786 | 17.0 | 1.07 | -- | -- |
| 10... | 0 | 2 | -- | -- | 674 | 51.0 | .92 | -- | -- |
| 16... | 0 | 2 | -- | -- | 640 | 12.8 | .87 | -- | -- |
| 31... | 0 | 1 | -- | -- | -- | -- | -- | -- | -- |
| SEP. | | | | | | | | | |
| 20... | 0 | 1 | -- | -- | 696 | 13.4 | .95 | -- | -- |
| 27... | 0 | 1 | -- | -- | 649 | 14.3 | .88 | -- | -- |
| OCT. | | | | | | | | | |
| 04... | 0 | 1 | -- | -- | 730 | -- | .99 | -- | -- |
| 09... | 0 | 0 | -- | -- | 749 | 6.05 | 1.02 | -- | -- |
| 16... | 0 | 0 | -- | -- | 738 | 8.31 | 1.00 | -- | -- |
| 23... | 0 | 0 | -- | -- | 718 | 10.3 | .98 | -- | -- |
| 31... | 0 | 0 | -- | -- | 762 | -- | 1.04 | -- | -- |
| NOV. | | | | | | | | | |
| 06... | 0 | 0 | -- | -- | 739 | 12.0 | 1.01 | -- | -- |
| 20... | 0 | 1 | -- | -- | 698 | 18.0 | .95 | -- | -- |
| DEC. | | | | | | | | | |
| 04... | <10 | 1 | -- | -- | 662 | 17.5 | .90 | .03 | .04 |

PROCESS DATE 02/03/75
DISTRICT CODE 08

09306007 - PICEANCE CREEK BELOW RIO BLANCO. CO.

WATER QUALITY DATA

| DATE | ALKA-LINITY AS CACO3 (MG/L) (00410) | BICAR-BONATE (HCO3) (MG/L) (00440) | CAR-BONATE (CO3) (MG/L) (00445) | OIL AND GREASE (MG/L) (00550) | DIS-SOLVED AMMONIA NITRO-GEN (N) (MG/L) (00608) | DIS-SOLVED NITRITE (N) (MG/L) (00613) | DIS-SOLVED NITRATE (N) (MG/L) (00618) | TOTAL KJEL-DAHL NITRO-GEN (N) (MG/L) (00625) | DIS-SOLVED NITRITE PLUS NITRATE (N) (MG/L) (00631) | DIS-SOLVED ORTHO PHOS-PHATE (PO4) (MG/L) (00660) | TOTAL PHOS-PHORUS (P) (MG/L) (00665) | DIS-SOLVED ORTHO. PHOS-PHORUS (P) (MG/L) (00671) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 23... | 374 | 456 | 0 | -- | -- | -- | -- | -- | .63 | .06 | -- | .02 |
| MAY | | | | | | | | | | | | |
| 03... | 353 | 436 | 0 | -- | -- | -- | -- | -- | .70 | .03 | -- | .01 |
| 17... | 423 | 516 | 0 | -- | -- | -- | -- | -- | .56 | .09 | -- | .03 |
| 22... | 491 | 599 | 0 | -- | -- | -- | -- | -- | .78 | .12 | -- | .04 |
| 31... | 492 | 600 | 0 | -- | -- | -- | -- | -- | .15 | .18 | -- | .06 |
| JUNE | | | | | | | | | | | | |
| 14... | 476 | 580 | 0 | -- | -- | -- | -- | -- | .08 | .05 | -- | .02 |
| 21... | 472 | 576 | 0 | -- | -- | -- | -- | -- | .03 | .03 | -- | .01 |
| 26... | 481 | 587 | 0 | -- | -- | -- | -- | -- | .04 | .06 | -- | .02 |
| JULY | | | | | | | | | | | | |
| 02... | 506 | 617 | 0 | -- | -- | -- | -- | -- | .01 | .00 | -- | .00 |
| 11... | 481 | 587 | 0 | -- | -- | -- | -- | -- | 2.5 | 1.1 | -- | .36 |
| 2[illegible]... | 362 | 441 | 0 | -- | -- | -- | -- | -- | .47 | .12 | -- | .04 |
| AUG. | | | | | | | | | | | | |
| 03... | 488 | 595 | 0 | -- | -- | -- | -- | -- | .15 | .06 | -- | .02 |
| 10... | 408 | 497 | 0 | -- | -- | -- | -- | -- | .69 | .12 | -- | .04 |
| 16... | 381 | 465 | -- | -- | -- | -- | -- | -- | .40 | .03 | -- | .01 |
| 31... | -- | -- | -- | -- | -- | -- | -- | -- | .12 | .03 | -- | .01 |
| SEP. | | | | | | | | | | | | |
| 2[illegible]... | 428 | 522 | -- | -- | -- | -- | -- | -- | .23 | .06 | -- | .02 |
| 27... | 412 | 502 | -- | -- | -- | -- | -- | -- | .21 | .03 | -- | .01 |
| OCT. | | | | | | | | | | | | |
| 04... | 440 | 537 | -- | -- | -- | -- | -- | -- | .07 | .00 | -- | .00 |
| 09... | 462 | 563 | -- | -- | -- | -- | -- | -- | .03 | .03 | -- | .01 |
| 16... | 449 | 548 | -- | -- | -- | -- | -- | -- | .02 | .00 | -- | .00 |
| 23... | 445 | 542 | -- | -- | -- | -- | -- | -- | .00 | .00 | -- | .00 |
| 31... | 478 | 583 | -- | -- | -- | -- | -- | -- | .04 | .09 | -- | .03 |
| NOV. | | | | | | | | | | | | |
| 06... | 472 | 576 | -- | -- | -- | -- | -- | -- | .07 | .09 | -- | .03 |
| 20... | 430 | 524 | -- | -- | -- | -- | -- | -- | .26 | .03 | -- | .01 |
| DEC. | | | | | | | | | | | | |
| 04... | 424 | 517 | 0 | 0 | .03 | .00 | .38 | .30 | .38 | .06 | .05 | .02 |

PROCESS DATE 03/75
DISTRICT CODE 08

## 09306007 - PICEANCE CREEK BELOW RIO BLANCO. CO.

### WATER QUALITY DATA

| DATE | DIS-SOLVED FLUO-RIDE (F) (MG/L) (00950) | DIS-SOLVED SILICA (SIO2) (MG/L) (00955) | DIS-SOLVED ARSENIC (AS) (UG/L) (01000) | DIS-SOLVED BARIUM (BA) (UG/L) (01005) | DIS-SOLVED BERYL-LIUM (BE) (UG/L) (01010) | DIS-SOLVED BISMUTH (BI) (UG/L) (01015) | DIS-SOLVED BORON (B) (UG/L) (01020) | DIS-SOLVED CAD-MIUM (CD) (UG/L) (01025) | DIS-SOLVED CHRO-MIUM (CR) (UG/L) (01030) | DIS-SOLVED COBALT (CO) (UG/L) (01035) | DIS-SOLVED COPPER (CU) (UG/L) (01040) | DIS-SOLVED IRON (FE) (UG/L) (01045) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 23... | 1.3 | 15 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 110 |
| MAY | | | | | | | | | | | | |
| 03... | .7 | 14 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 40 |
| 17... | .8 | 17 | 2 | -- | -- | -- | -- | -- | -- | -- | -- | 40 |
| 22... | .9 | 17 | 1 | 130 | <5 | <11 | 200 | 0 | <8 | <15 | <4 | 300 |
| 31... | .9 | 17 | 2 | 200 | -- | -- | 240 | 1 | -- | -- | 4 | 30 |
| JUNE | | | | | | | | | | | | |
| 14... | 1.0 | 15 | 1 | 200 | -- | -- | 250 | 0 | -- | -- | 2 | 40 |
| 21... | .9 | 13 | 3 | 0 | -- | -- | 260 | 1 | -- | -- | 3 | 20 |
| 25... | .9 | 16 | 2 | <100 | -- | -- | 250 | 2 | -- | -- | 9 | 40 |
| JULY | | | | | | | | | | | | |
| 02... | .8 | 14 | 5 | <100 | -- | -- | 250 | 0 | -- | -- | 5 | 50 |
| 11... | .2 | 17 | 4 | <100 | -- | -- | 280 | 1 | -- | -- | 1 | 50 |
| 29... | .7 | 15 | 3 | 0 | -- | -- | 260 | 1 | -- | -- | 12 | 150 |
| AUG. | | | | | | | | | | | | |
| [illegible]3... | .9 | 18 | 2 | 0 | -- | -- | 240 | 1 | -- | -- | 2 | 90 |
| 1[illegible]... | .8 | 17 | 3 | 0 | -- | -- | 200 | <1 | -- | -- | 4 | 50 |
| 15... | .6 | 16 | 2 | 100 | -- | -- | 220 | <1 | -- | -- | 3 | 50 |
| [illegible]1... | .9 | 16 | 3 | 100 | -- | -- | 240 | 1 | -- | -- | 3 | 70 |
| SEP. | | | | | | | | | | | | |
| 2[illegible]... | 1.0 | 16 | 2 | 100 | -- | -- | 120 | 1 | -- | -- | 1 | 30 |
| 27... | 1.1 | 15 | 2 | 0 | -- | -- | 160 | <1 | -- | -- | 0 | 120 |
| OCT. | | | | | | | | | | | | |
| 04... | 1.1 | 17 | 2 | 0 | -- | -- | 260 | <1 | -- | -- | 1 | 30 |
| 09... | 1.1 | 17 | 3 | <100 | -- | -- | 290 | <1 | -- | -- | 6 | 60 |
| 15... | 1.0 | 17 | 2 | 100 | -- | -- | 200 | 0 | -- | -- | 0 | 60 |
| 23... | 1.2 | 16 | 1 | 0 | -- | -- | 280 | 0 | -- | -- | 0 | 80 |
| 31... | 1.0 | 18 | 1 | 100 | -- | -- | 190 | 0 | -- | -- | 1 | 40 |
| NOV. | | | | | | | | | | | | |
| 05... | 1.0 | 16 | 2 | <100 | -- | -- | 250 | 1 | -- | -- | 2 | 390 |
| 20... | 1.0 | 15 | 4 | <100 | -- | -- | 230 | 0 | -- | -- | 1 | 10 |
| DEC. | | | | | | | | | | | | |
| 4... | 1.1 | 15 | 3 | <100 | -- | -- | 230 | 1 | <10 | -- | 1 | 10 |

09306007 - PICEANCE CREEK BELOW RIO BLANCO. CO.

WATER QUALITY DATA

| DATE | DIS-SOLVED LEAD (PB) (UG/L) (01049) | DIS-SOLVED MAN-GANESE (MN) (UG/L) (01056) | DIS-SOLVED MOLYB-DENUM (MO) (UG/L) (01060) | DIS-SOLVED NICKEL (NI) (UG/L) (01065) | DIS-SOLVED SILVER (AG) (UG/L) (01075) | DIS-SOLVED STRON-TIUM (SR) (UG/L) (01080) | DIS-SOLVED VANA-DIUM (V) (UG/L) (01085) | DIS-SOLVED ZINC (ZN) (UG/L) (01090) | DIS-SOLVED TIN (SN) (UG/L) (01100) | DIS-SOLVED ALUM-INUM (AL) (UG/L) (01106) | DIS-SOLVED GALLIUM (GA) (UG/L) (01120) | DIS-SOLVED GER-MANIUM (GE) (UG/L) (01125) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 23... | -- | 30 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MAY | | | | | | | | | | | | |
| 13... | -- | 10 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 17... | -- | 100 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | <15 | 210 | 6 | <3 | <2 | 1600 | <8.0 | 10 | <11 | 60 | <8 | <16 |
| 31... | 5 | 140 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- |
| JUNE | | | | | | | | | | | | |
| 14... | 7 | 40 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- |
| 21... | 8 | 180 | -- | -- | -- | -- | -- | 40 | -- | -- | -- | -- |
| 26... | 7 | 200 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- |
| JULY | | | | | | | | | | | | |
| 02... | 1 | 230 | -- | -- | -- | -- | -- | 0 | -- | -- | -- | -- |
| 11... | 4 | 180 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- |
| 23... | 3 | 140 | -- | -- | -- | -- | -- | 40 | -- | -- | -- | -- |
| AUG. | | | | | | | | | | | | |
| 13... | 4 | 180 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- |
| 16... | 2 | 70 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- |
| 26... | 1 | 40 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- |
| 31... | 6 | 50 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- |
| SEP. | | | | | | | | | | | | |
| 20... | 4 | 50 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- |
| 27... | 2 | 50 | -- | -- | -- | -- | -- | 0 | -- | -- | -- | -- |
| OCT. | | | | | | | | | | | | |
| 04... | 0 | 100 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- |
| 09... | 4 | 170 | -- | -- | -- | -- | -- | 60 | -- | -- | -- | -- |
| 16... | 3 | 150 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- |
| 23... | 1 | 140 | -- | -- | -- | -- | -- | 0 | -- | -- | -- | -- |
| 31... | 1 | 230 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- |
| NOV. | | | | | | | | | | | | |
| 06... | 3 | 230 | -- | -- | -- | -- | -- | 50 | -- | -- | -- | -- |
| 20... | 2 | 110 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- |
| DEC. | | | | | | | | | | | | |
| 14... | 4 | 70 | -- | -- | -- | -- | -- | 0 | -- | -- | -- | -- |

PROCESS DATE 02/03/75
09306007 - PICEANCE CREEK BELOW RIO BLANCO, CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | DIS_ SOLVED NITRATE (NO3) (MG/L) (71851) | DIS_ SOLVED NITRITE (NO2) (MG/L) (71856) | DIS- SOLVED MERCURY (HG) (UG/L) (71890) | ELEV. OF LAND SURFACE DATUM (FT. ABOVE MSL) (72000) |
|---|---|---|---|---|
| APR., 1974 | | | | |
| 23... | -- | -- | -- | 6366 |
| MAY | | | | |
| 03... | -- | -- | -- | 6366 |
| 17... | -- | -- | .0 | 6366 |
| 22... | -- | -- | .0 | 6366 |
| 31... | -- | -- | .0 | 6366 |
| JUNE | | | | |
| 14... | -- | -- | .0 | 6366 |
| 21... | -- | -- | .0 | 6366 |
| 26... | -- | -- | .0 | 6366 |
| JULY | | | | |
| 02... | -- | -- | .0 | 6366 |
| 11... | -- | -- | .0 | 6366 |
| 20... | -- | -- | .0 | 6366 |
| AUG. | | | | |
| 03... | -- | -- | .0 | 6366 |
| 10... | -- | -- | .0 | 6366 |
| 16... | -- | -- | .0 | 6366 |
| 31... | -- | -- | .8 | 6366 |
| SEP. | | | | |
| 20... | -- | -- | .0 | 6366 |
| 27... | -- | -- | .1 | 6366 |
| OCT. | | | | |
| 04... | -- | -- | .0 | 6366 |
| 09... | -- | -- | .0 | 6366 |
| 16... | -- | -- | .0 | 6366 |
| 23... | -- | -- | .0 | 6366 |
| 31... | -- | -- | .0 | 6366 |
| NOV. | | | | |
| 05... | -- | -- | .0 | 6366 |
| 20... | -- | -- | .0 | 6366 |
| DEC. | | | | |
| 04... | 1.7 | .00 | <.1 | 6366 |

09306007 - PICEANCE CREEK LOW RIO BLANCO, CO.

WATER QUALITY DATA

| DATE | TIME | TYPE | SAMPLE NUMBER (00008) | TEMPER-ATURE (DEG C) (00010) | DIS-CHARGE (CFS) (00060) | INSTAN-TANEOUS DIS-CHARGE (CFS) (00061) | TUR-BID-ITY (JTU) (00070) | COLOR (PLAT-INUM-COBALT UNITS) (00080) | SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS) (00095) | CHEM-ICAL OXYGEN DEMAND (HIGH LEVEL) (MG/L) (00340) | PH (UNITS) (00400) | CARBON DIOXIDE (CO2) (MG/L) (00405) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 23... | 1230 | 2 | -- | 10.0 | -- | 25 | -- | -- | 977 | -- | 8.2 | 4.6 |
| MAY | | | | | | | | | | | | |
| 03... | 1100 | 2 | -- | 7.5 | -- | 34 | -- | -- | 912 | -- | 8.2 | 4.4 |
| 17... | 1130 | 2 | -- | 9.0 | 12 | -- | -- | -- | 1080 | -- | 8.2 | 5.2 |
| 22... | 1100 | 2 | 1881 | 11.0 | -- | 6.6 | -- | -- | 1240 | -- | 8.1 | 7.6 |
| 31... | 1230 | 2 | -- | 15.0 | -- | 6.4 | -- | -- | 1220 | -- | 8.3 | 4.8 |
| JUNE | | | | | | | | | | | | |
| 14... | 1210 | 2 | -- | 19.0 | 6.9 | -- | -- | -- | 1190 | -- | 8.2 | 5.9 |
| 21... | -- | 2 | -- | 19.0 | -- | 7.0 | -- | -- | 1200 | -- | 8.2 | 5.8 |
| 26... | 1030 | 2 | -- | 16.0 | 7.3 | -- | -- | -- | 1270 | -- | 8.3 | 4.7 |
| JULY | | | | | | | | | | | | |
| 02... | 0900 | 2 | -- | 10.5 | -- | 6.4 | -- | -- | 1250 | -- | 8.2 | 6.2 |
| 11... | 1530 | 2 | -- | 22.0 | -- | 4.0 | -- | -- | 1250 | -- | 8.1 | 7.5 |
| 20... | 1445 | 2 | -- | 20.0 | -- | 14 | -- | -- | 1030 | -- | 7.8 | 11 |
| AUG. | | | | | | | | | | | | |
| 03... | 0915 | 2 | -- | 13.0 | 8.0 | -- | -- | -- | 1210 | -- | 8.1 | 7.5 |
| 10... | 1245 | 2 | -- | 14.0 | 28 | -- | -- | -- | 1020 | -- | 8.2 | 5.0 |
| 17... | 1500 | 2 | -- | 21.0 | -- | 7.4 | -- | -- | 1010 | -- | -- | -- |
| 31... | 1530 | 2 | -- | 19.5 | -- | 8.4 | -- | -- | -- | -- | 6.9 | -- |
| SEP. | | | | | | | | | | | | |
| 20... | 1000 | 2 | -- | 8.0 | -- | 7.1 | -- | -- | 1080 | -- | -- | -- |
| 27... | 1100 | 2 | -- | 7.0 | -- | 8.1 | -- | -- | 1060 | -- | -- | -- |
| OCT. | | | | | | | | | | | | |
| 04... | 1330 | 2 | -- | 13.0 | -- | -- | -- | -- | 1140 | -- | -- | -- |
| 09... | 1340 | 2 | -- | 14.0 | -- | 2.9 | -- | -- | 1190 | -- | -- | -- |
| 16... | 1420 | 2 | -- | 13.0 | -- | 4.1 | -- | -- | 1160 | -- | -- | -- |
| 23... | 1300 | 2 | -- | 11.0 | -- | 5.3 | -- | -- | 1160 | -- | -- | -- |
| 31... | 1000 | 2 | -- | 5.0 | -- | -- | -- | -- | 1130 | -- | -- | -- |
| NOV. | | | | | | | | | | | | |
| 06... | 1000 | 2 | -- | 5.0 | -- | 6.0 | -- | -- | 1200 | -- | -- | -- |
| 20... | 1200 | 2 | -- | 4.0 | -- | 9.5 | -- | -- | 1090 | -- | 8.0 | 8.4 |
| DEC. | | | | | | | | | | | | |
| 04... | 1340 | 2 | 751700 | 4.0 | -- | 9.8 | 20 | 5 | 1070 | 9 | 8.2 | 5.2 |
| 18... | 0910 | 2 | -- | .0 | -- | 11 | 20 | 2 | 1200 | -- | 8.4 | 3.4 |
| 31... | 1200 | 2 | -- | 1.0 | -- | 7.8 | 6 | 3 | 1100 | -- | 8.3 | 4.4 |
| JAN.. 1975 | | | | | | | | | | | | |
| 15... | -- | 2 | -- | 1.0 | -- | 9.5 | 30 | 5 | 1200 | -- | 8.1 | 7.0 |
| FEB. | | | | | | | | | | | | |
| 03... | 1155 | 2 | -- | 1.0 | -- | 12 | 10 | 3 | 1120 | -- | 9.0 | .9 |

09306007 - PICEANCE CREE ELOW RIO BLANCO. CO.

WATER QUALITY DATA

| DATE | ALKA-LINITY AS CACO3 (MG/L) (00410) | BICAR-BONATE (HCO3) (MG/L) (00440) | CAR-BONATE (CO3) (MG/L) (00445) | OIL AND GREASE (MG/L) (00550) | DIS-SOLVED AMMONIA NITRO-GEN (N) (MG/L) (00608) | DIS-SOLVED NITRITE (N) (MG/L) (00613) | DIS-SOLVED NITRATE (N) (MG/L) (00618) | TOTAL KJEL-DAHL NITRO-GEN (N) (MG/L) (00625) | DIS-SOLVED NITRITE PLUS NITRATE (N) (MG/L) (00631) | DIS-SOLVED ORTHO PHOS-PHATE (PO4) (MG/L) (00660) | TOTAL PHOS-PHORUS (P) (MG/L) (00665) | DIS-SOLVED ORTHO. PHOS-PHORUS (P) (MG/L) (00671) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 23... | 374 | 455 | 0 | -- | -- | -- | -- | -- | .63 | .05 | -- | .02 |
| MAY | | | | | | | | | | | | |
| 03... | 358 | 436 | 0 | -- | -- | -- | -- | -- | .70 | .03 | -- | .01 |
| 17... | 423 | 516 | 0 | -- | -- | -- | -- | -- | .56 | .09 | -- | .03 |
| 22... | 491 | 549 | 0 | -- | -- | -- | -- | -- | .28 | .12 | -- | .04 |
| 31... | 492 | 600 | 0 | -- | -- | -- | -- | -- | .15 | .18 | -- | .06 |
| JUNE | | | | | | | | | | | | |
| 14... | 476 | 580 | 0 | -- | -- | -- | -- | -- | .08 | .06 | -- | .02 |
| 21... | 472 | 576 | 0 | -- | -- | -- | -- | -- | .03 | .03 | -- | .01 |
| 25... | 461 | 587 | 0 | -- | -- | -- | -- | -- | .04 | .06 | -- | .02 |
| JULY | | | | | | | | | | | | |
| 02... | 506 | 617 | 0 | -- | -- | -- | -- | -- | .01 | .00 | -- | .00 |
| 11... | 481 | 567 | 0 | -- | -- | -- | -- | -- | 2.5 | 1.1 | -- | .36 |
| 26... | 362 | 441 | 0 | -- | -- | -- | -- | -- | .47 | .12 | -- | .04 |
| AUG. | | | | | | | | | | | | |
| 03... | 488 | 595 | 0 | -- | -- | -- | -- | -- | .15 | .06 | -- | .02 |
| 10... | 408 | 497 | 0 | -- | -- | -- | -- | -- | .69 | .12 | -- | .04 |
| 15... | 381 | 465 | -- | -- | -- | -- | -- | -- | .40 | .03 | -- | .01 |
| 31... | -- | -- | -- | -- | -- | -- | -- | -- | .12 | .03 | -- | .01 |
| SEP. | | | | | | | | | | | | |
| 20... | 428 | 522 | -- | -- | -- | -- | -- | -- | .23 | .06 | -- | .02 |
| 27... | 412 | 502 | -- | -- | -- | -- | -- | -- | .21 | .03 | -- | .01 |
| OCT. | | | | | | | | | | | | |
| 04... | 440 | 537 | -- | -- | -- | -- | -- | -- | .07 | .00 | -- | .00 |
| 09... | 462 | 563 | -- | -- | -- | -- | -- | -- | .03 | .03 | -- | .01 |
| 15... | 449 | 548 | -- | -- | -- | -- | -- | -- | .02 | .00 | -- | .00 |
| 23... | 445 | 542 | -- | -- | -- | -- | -- | -- | .00 | .00 | -- | .00 |
| 31... | 478 | 583 | -- | -- | -- | -- | -- | -- | .04 | .09 | -- | .03 |
| NOV. | | | | | | | | | | | | |
| 06... | 472 | 576 | -- | -- | -- | -- | -- | -- | .07 | .09 | -- | .03 |
| 20... | 430 | 524 | -- | -- | -- | -- | -- | -- | .26 | .03 | -- | .01 |
| DEC. | | | | | | | | | | | | |
| 04... | 424 | 517 | 0 | 0 | .03 | .00 | .38 | .30 | .38 | .06 | .05 | .02 |
| 18... | 442 | 539 | 0 | 1 | .04 | .02 | .33 | .33 | .35 | .09 | .09 | .03 |
| 31... | 454 | 554 | 0 | 1 | .08 | .00 | .43 | .25 | .43 | .15 | .05 | .05 |
| JAN., 1975 | | | | | | | | | | | | |
| 15... | 453 | 552 | 0 | 8 | .13 | .01 | .56 | .48 | .57 | .06 | .08 | .02 |
| FEB. | | | | | | | | | | | | |
| 03... | 461 | 562 | 0 | 6 | .06 | .01 | .32 | .61 | .33 | .12 | .16 | .04 |

WATER QUALITY DATA

| DATE | CYANIDE (CN) (MG/L) (00720) | DIS-SOL-VED SUL-FIDE (S) (MG/L) (00745) | HARD-NESS (CA+MG) (MG/L) (00900) | NON-CAR-BONATE HARD-NESS (MG/L) (00902) | DIS-SOLVED CAL-CIUM (CA) (MG/L) (00915) | DIS-SOLVED MAG-NE-SIUM (MG) (MG/L) (00925) | DIS-SOLVED SODIUM (NA) (MG/L) (00930) | SODIUM AD-SORP-TION RATIO (00931) | PERCENT SODIUM (00932) | DIS-SOLVED PO-TAS-SIUM (K) (MG/L) (00935) | DIS-SOLVED CHLO-RIDE (CL) (MG/L) (00940) | DIS-SOLVED SULFATE (SO4) (MG/L) (00945) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 23... | -- | -- | 340 | 0 | 69 | 40 | 96 | 2.3 | 38 | 2.7 | 13 | 160 |
| MAY | | | | | | | | | | | | |
| 03... | -- | -- | 320 | 0 | 66 | 38 | 88 | 2.1 | 37 | 3.1 | 9.7 | 140 |
| 17... | -- | -- | 380 | 0 | 74 | 47 | 110 | 2.5 | 38 | 3.4 | 12 | 180 |
| 22... | -- | -- | 410 | 0 | 77 | 52 | 140 | 3.0 | 43 | 2.9 | 15 | 190 |
| 31... | -- | -- | 410 | 0 | 76 | 53 | 140 | 3.0 | 42 | 4.3 | 17 | 180 |
| JUNE | | | | | | | | | | | | |
| 14... | -- | -- | 400 | 0 | 73 | 52 | 150 | 3.3 | 45 | 3.7 | 15 | 180 |
| 21... | -- | -- | 390 | 0 | 75 | 49 | 140 | 3.1 | 44 | 3.4 | 17 | 180 |
| 28... | -- | -- | 400 | 0 | 76 | 50 | 150 | 3.3 | 45 | 4.1 | 16 | 180 |
| JULY | | | | | | | | | | | | |
| 02... | -- | -- | 420 | 0 | 74 | 56 | 150 | 3.2 | 44 | 3.5 | 16 | 190 |
| 11... | -- | -- | 410 | 0 | 72 | 57 | 160 | 3.4 | 45 | 3.8 | 17 | 200 |
| 20... | -- | -- | 340 | 0 | 73 | 39 | 110 | 2.6 | 41 | 5.7 | 16 | 190 |
| AUG. | | | | | | | | | | | | |
| 03... | -- | -- | 390 | 0 | 75 | 48 | 140 | 3.1 | 44 | 3.9 | 16 | 130 |
| 10... | -- | -- | 350 | 0 | 69 | 42 | 110 | 2.6 | 41 | 3.4 | 13 | 170 |
| 16... | -- | -- | 340 | 0 | 65 | 42 | 120 | 2.9 | 44 | 2.4 | 13 | 150 |
| 31... | -- | -- | 320 | -- | 51 | 47 | 130 | 3.2 | 46 | 4.3 | 15 | 150 |
| SEP. | | | | | | | | | | | | |
| 20... | -- | -- | 380 | 0 | 70 | 50 | 120 | 2.7 | 40 | 4.2 | 16 | 160 |
| 27... | -- | -- | 340 | 0 | 63 | 44 | 110 | 2.6 | 41 | 3.2 | 13 | 150 |
| OCT. | | | | | | | | | | | | |
| 04... | -- | -- | 370 | 0 | 69 | 49 | 140 | 3.2 | 45 | 2.8 | 16 | 170 |
| 09... | -- | -- | 350 | 0 | 69 | 43 | 150 | 3.5 | 48 | 3.1 | 17 | 170 |
| 16... | -- | -- | 380 | 0 | 70 | 50 | 140 | 3.1 | 44 | 3.3 | 16 | 170 |
| 23... | -- | -- | 360 | 0 | 68 | 46 | 130 | 3.0 | 44 | 3.5 | 16 | 170 |
| 31... | -- | -- | 400 | 0 | 76 | 50 | 140 | 3.1 | 43 | 3.8 | 15 | 170 |
| NOV. | | | | | | | | | | | | |
| 05... | -- | -- | 360 | 0 | 75 | 42 | 140 | 3.2 | 46 | 3.8 | 16 | 160 |
| 21... | -- | -- | 350 | 0 | 71 | 42 | 130 | 3.0 | 44 | 2.9 | 16 | 160 |
| DEC. | | | | | | | | | | | | |
| 04... | .00 | .0 | 330 | 0 | 58 | 45 | 120 | 2.9 | 44 | 2.4 | 13 | 150 |
| 18... | .00 | .5 | 390 | 0 | 76 | 48 | 130 | 2.9 | 42 | 2.9 | 15 | 170 |
| 31... | .00 | .9 | 360 | 0 | 73 | 43 | 120 | 2.8 | 42 | 2.9 | 14 | 150 |
| JAN., 1975 | | | | | | | | | | | | |
| 15... | .00 | .0 | 370 | 0 | 74 | 46 | 130 | 2.9 | 43 | 3.4 | 16 | 160 |
| FEB. | | | | | | | | | | | | |
| 03... | .00 | .1 | 370 | 0 | 72 | 46 | 130 | 2.9 | 43 | 2.6 | 19 | 170 |

09306007 - PICEANCE C K BELOW RIO BLANCO, CO.

PROCESS 03/03/75
DISTRICT CODE 08

WATER QUALITY DATA

| DATE | DIS-SOLVED FLUO-RIDE (F) (MG/L) (00950) | DIS-SOLVED SILICA (SIO2) (MG/L) (00955) | DIS-SOLVED ARSENIC (AS) (UG/L) (01000) | DIS-SOLVED BARIUM (BA) (UG/L) (01005) | DIS-SOLVED BERYL-LIUM (BE) (UG/L) (01010) | DIS-SOLVED BISMUTH (BI) (UG/L) (01015) | DIS-SOLVED BORON (B) (UG/L) (01020) | DIS-SOLVED CAD-MIUM (CD) (UG/L) (01025) | DIS-SOLVED CHRO-MIUM (CR) (UG/L) (01030) | DIS-SOLVED COBALT (CO) (UG/L) (01035) | DIS-SOLVED COPPER (CU) (UG/L) (01040) | DIS-SOLVED IRON (FE) (UG/L) (01045) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 23... | 1.3 | 15 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 110 |
| MAY | | | | | | | | | | | | |
| 03... | .7 | 14 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 40 |
| 17... | .8 | 17 | 2 | -- | -- | -- | -- | -- | -- | -- | -- | 40 |
| 22... | .9 | 17 | 1 | 130 | <6 | <11 | 200 | 0 | <8 | <15 | <4 | 300 |
| 31... | .9 | 17 | 2 | 200 | -- | -- | 240 | 1 | -- | -- | 4 | 30 |
| JUNE | | | | | | | | | | | | |
| 14... | 1.0 | 15 | 1 | 200 | -- | -- | 250 | 0 | -- | -- | 2 | 40 |
| [illegible]... | .9 | 13 | 3 | 0 | -- | -- | 260 | 1 | -- | -- | 3 | 20 |
| 25... | .9 | 15 | 2 | <100 | -- | -- | 250 | 2 | -- | -- | 9 | 40 |
| JULY | | | | | | | | | | | | |
| 02... | .3 | 14 | 5 | <100 | -- | -- | 250 | 0 | -- | -- | 5 | 50 |
| 11... | .2 | 17 | 4 | <100 | -- | -- | 280 | 1 | -- | -- | 1 | 50 |
| 20... | .7 | 15 | 3 | 0 | -- | -- | 260 | 1 | -- | -- | 12 | 150 |
| AUG. | | | | | | | | | | | | |
| [illegible]... | .9 | 16 | 2 | 0 | -- | -- | 240 | 1 | -- | -- | 2 | 90 |
| [illegible]... | .8 | 17 | 3 | 0 | -- | -- | 200 | <1 | -- | -- | 4 | 50 |
| 15... | .6 | 16 | 2 | 100 | -- | -- | 220 | <1 | -- | -- | 3 | 50 |
| 31... | .9 | 16 | 3 | 100 | -- | -- | 240 | 1 | -- | -- | 3 | 70 |
| SEP. | | | | | | | | | | | | |
| 20... | 1.0 | 16 | 2 | 100 | -- | -- | 120 | 1 | -- | -- | 1 | 30 |
| 27... | 1.1 | 16 | 2 | 0 | -- | -- | 160 | <1 | -- | -- | 0 | 120 |
| OCT. | | | | | | | | | | | | |
| 04... | 1.1 | 17 | 2 | 0 | -- | -- | 260 | <1 | -- | -- | 1 | 30 |
| 09... | 1.1 | 17 | 3 | <100 | -- | -- | 290 | <1 | -- | -- | 6 | 60 |
| 16... | 1.0 | 17 | 2 | 100 | -- | -- | 200 | 0 | -- | -- | 0 | 60 |
| 23... | 1.2 | 16 | 1 | 0 | -- | -- | 280 | 0 | -- | -- | 0 | 80 |
| 31... | 1.0 | 18 | 1 | 100 | -- | -- | 190 | 0 | -- | -- | 1 | 40 |
| NOV. | | | | | | | | | | | | |
| 05... | 1.0 | 16 | 2 | <100 | -- | -- | 250 | 1 | -- | -- | 2 | 390 |
| 20... | 1.0 | 15 | 4 | <100 | -- | -- | 230 | 0 | -- | -- | 1 | 10 |
| DEC. | | | | | | | | | | | | |
| [illegible]... | 1.1 | 15 | 3 | 130 | <1 | <5 | 130 | <15 | <5 | <5 | 1 | 300 |
| [illegible]... | 1.0 | 3.4 | 3 | 100 | -- | -- | 220 | 0 | 0 | -- | 1 | 10 |
| 31... | 1.1 | 15 | 1 | 100 | -- | -- | 210 | 0 | 0 | -- | 0 | 10 |
| JAN., 1975 | | | | | | | | | | | | |
| 15... | 1.2 | 17 | 1 | 0 | -- | -- | 240 | 2 | 10 | -- | 8 | 20 |
| FEB. | | | | | | | | | | | | |
| 03... | 1.1 | 16 | 5 | 100 | -- | -- | 190 | 0 | 0 | -- | 1 | 20 |

09306007 - PICEANCE CRE[illegible]ELOW RIO BLANCO. CO.

WATER QUALITY DATA

| DATE | DIS-SOLVED LEAD (PB) (UG/L) (01049) | DIS-SOLVED MAN-GANESE (MN) (UG/L) (01056) | DIS-SOLVED MOLYB-DENUM (MO) (UG/L) (01060) | DIS-SOLVED NICKEL (NI) (UG/L) (01065) | DIS-SOLVED SILVER (AG) (UG/L) (01075) | DIS-SOLVED STRON-TIUM (SR) (UG/L) (01080) | DIS-SOLVED VANA-DIUM (V) (UG/L) (01085) | DIS-SOLVED ZINC (ZN) (UG/L) (01090) | DIS-SOLVED TIN (SN) (UG/L) (01100) | DIS-SOLVED ALUM-INUM (AL) (UG/L) (01106) | DIS-SOLVED GALLIUM (GA) (UG/L) (01120) | DIS-SOLVED GER-MANIUM (GE) (UG/L) (01125) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 23... | -- | 30 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MAY | | | | | | | | | | | | |
| 03... | -- | 10 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 17... | -- | 100 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | <15 | 210 | 6 | <8 | <2 | 1600 | <8.0 | 10 | <11 | 60 | <8 | <16 |
| 31... | 5 | 140 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- |
| JUNE | | | | | | | | | | | | |
| 14... | 7 | 40 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- |
| 21... | 8 | 180 | -- | -- | -- | -- | -- | 40 | -- | -- | -- | -- |
| 25... | 7 | 200 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- |
| JULY | | | | | | | | | | | | |
| 02... | 1 | 230 | -- | -- | -- | -- | -- | 0 | -- | -- | -- | -- |
| 11... | 4 | 180 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- |
| 20... | 3 | 140 | -- | -- | -- | -- | -- | 40 | -- | -- | -- | -- |
| AUG. | | | | | | | | | | | | |
| 03... | 4 | 180 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- |
| 10... | 2 | 70 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- |
| 15... | 1 | 40 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- |
| 31... | 6 | 50 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- |
| SEP. | | | | | | | | | | | | |
| 20... | 4 | 50 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- |
| 27... | 2 | 50 | -- | -- | -- | -- | -- | 0 | -- | -- | -- | -- |
| OCT. | | | | | | | | | | | | |
| 04... | 0 | 100 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- |
| 09... | 4 | 170 | -- | -- | -- | -- | -- | 60 | -- | -- | -- | -- |
| 16... | 3 | 160 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- |
| 23... | 1 | 140 | -- | -- | -- | -- | -- | 0 | -- | -- | -- | -- |
| 31... | 1 | 230 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- |
| NOV. | | | | | | | | | | | | |
| 05... | 3 | 230 | -- | -- | -- | -- | -- | 50 | -- | -- | -- | -- |
| 20... | 2 | 110 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- |
| DEC. | | | | | | | | | | | | |
| 04... | <5 | 100 | 7 | <4 | 0 | 1800 | <3.0 | <15 | <5 | 450 | <3 | <5 |
| 16... | 1 | 80 | -- | -- | -- | -- | -- | 0 | -- | -- | -- | -- |
| 31... | 0 | 50 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- |
| JAN., 1975 | | | | | | | | | | | | |
| 15... | 7 | 50 | -- | -- | -- | -- | -- | 40 | -- | -- | -- | -- |
| FEB. | | | | | | | | | | | | |
| 03... | 6 | 67 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- |

09306007 - PICEANCE CRE[illegible]ELOW RIO BLANCO, CO.

WATER QUALITY DATA

| DATE | DIS- SOLVED LITHIUM (LI) (UG/L) (01130) | DIS- SOLVED SELE- NIUM (SE) (UG/L) (01145) | DIS- SOLVED TI- TANIUM (TI) (UG/L) (01150) | DIS- SOLVED ZIR- CONIUM (ZR) (UG/L) (01160) | DIS- SOLVED SOLIDS (SUM OF CONSTI- TUENTS) (MG/L) (70301) | DIS- SOLVED SOLIDS (TONS PER DAY) (70302) | DIS- SOLVED SOLIDS (TONS PER AC-FT) (70303) | TOTAL ORTHO PHOS- PHORUS (P) (MG/L) (70507) | DIS_ SOLVED AMMONIA (NH4) (MG/L) (71845) |
|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | |
| 23... | -- | -- | -- | -- | 625 | 43.5 | .85 | -- | -- |
| MAY | | | | | | | | | |
| 03... | -- | -- | -- | -- | 578 | 53.7 | .79 | -- | -- |
| 17... | -- | 0 | -- | -- | 701 | 22.7 | .95 | -- | -- |
| 22... | 10 | 2 | <8 | <24 | 792 | 14.2 | 1.08 | -- | -- |
| 31... | 10 | 1 | -- | -- | 786 | 13.6 | 1.07 | -- | -- |
| JUNE | | | | | | | | | |
| 14... | 10 | 1 | -- | -- | 776 | 14.5 | 1.06 | -- | -- |
| 21... | 10 | 1 | -- | -- | 764 | 14.4 | 1.04 | -- | -- |
| 25... | 10 | 0 | -- | -- | 783 | 15.4 | 1.06 | -- | -- |
| JULY | | | | | | | | | |
| 02... | 0 | 1 | -- | -- | 809 | 14.1 | 1.10 | -- | -- |
| 11... | 0 | 1 | -- | -- | 829 | 9.04 | 1.13 | -- | -- |
| 20... | 0 | 0 | -- | -- | 670 | 26.4 | .91 | -- | -- |
| AUG. | | | | | | | | | |
| 03... | 0 | 1 | -- | -- | 786 | 17.0 | 1.07 | -- | -- |
| 10... | 0 | 2 | -- | -- | 674 | 51.0 | .92 | -- | -- |
| 16... | 0 | 2 | -- | -- | 640 | 12.8 | .87 | -- | -- |
| 31... | 0 | 1 | -- | -- | -- | -- | -- | -- | -- |
| SEP. | | | | | | | | | |
| 20... | 0 | 1 | -- | -- | 696 | 13.4 | .95 | -- | -- |
| 27... | 0 | 1 | -- | -- | 649 | 14.3 | .88 | -- | -- |
| OCT. | | | | | | | | | |
| 04... | 0 | 1 | -- | -- | 730 | -- | .99 | -- | -- |
| 09... | 0 | 0 | -- | -- | 749 | 6.05 | 1.02 | -- | -- |
| 16... | 0 | 0 | -- | -- | 738 | 8.31 | 1.00 | -- | -- |
| 23... | 0 | 0 | -- | -- | 718 | 10.3 | .98 | -- | -- |
| 31... | 0 | 0 | -- | -- | 762 | -- | 1.04 | -- | -- |
| NOV. | | | | | | | | | |
| 06... | 0 | 0 | -- | -- | 739 | 12.0 | 1.01 | -- | -- |
| 20... | 0 | 1 | -- | -- | 698 | 18.0 | .95 | -- | -- |
| DEC. | | | | | | | | | |
| 04... | 8 | 1 | 25 | <10 | 664 | 17.6 | .90 | .03 | .04 |
| 18... | 20 | 2 | -- | -- | 715 | 21.2 | .97 | .05 | .05 |
| 31... | 20 | 1 | -- | -- | 697 | 14.8 | .95 | .05 | .10 |
| JAN., 1975 | | | | | | | | | |
| 15... | 20 | 1 | -- | -- | 723 | 18.6 | .98 | .05 | .17 |
| FEB. | | | | | | | | | |
| 03... | 20 | 1 | -- | -- | 735 | 24.4 | 1.00 | .04 | .08 |

09306007 - PICEANCE CREEK [illegible]OW RIO BLANCO, CO.

PROCESS DATE [illegible]3/75
DISTRICT CODE 08

WATER QUALITY DATA

| DATE | DIS- SOLVED NITRATE (NO3) (MG/L) (71851) | DIS- SOLVED NITRITE (NO2) (MG/L) (71856) | DIS- SOLVED MERCURY (HG) (UG/L) (71890) | ELEV. OF LAND SURFACE DATUM (FT. ABOVE MSL) (72000) |
|---|---|---|---|---|
| APR., 1974 | | | | |
| 23... | -- | -- | -- | 6366 |
| MAY | | | | |
| 03... | -- | -- | -- | 6366 |
| 17... | -- | -- | .0 | 6366 |
| 22... | -- | -- | .0 | 6366 |
| 31... | -- | -- | .0 | 6366 |
| JUNE | | | | |
| 14... | -- | -- | .0 | 6366 |
| 21... | -- | -- | .0 | 6366 |
| 26... | -- | -- | .0 | 6366 |
| JULY | | | | |
| 02... | -- | -- | .0 | 6366 |
| 11... | -- | -- | .0 | 6366 |
| 20... | -- | -- | .0 | 6366 |
| AUG. | | | | |
| 03... | -- | -- | .0 | 6366 |
| 10... | -- | -- | .0 | 6366 |
| 16... | -- | -- | .0 | 6366 |
| 31... | -- | -- | .8 | 6366 |
| SEP. | | | | |
| 20... | -- | -- | .0 | 6366 |
| 27... | -- | -- | .1 | 6366 |
| OCT. | | | | |
| 04... | -- | -- | .0 | 6366 |
| 09... | -- | -- | .0 | 6366 |
| 16... | -- | -- | .0 | 6366 |
| 23... | -- | -- | .0 | 6366 |
| 31... | -- | -- | .0 | 6366 |
| NOV. | | | | |
| 05... | -- | -- | .0 | 6366 |
| 20... | -- | -- | .0 | 6366 |
| DEC. | | | | |
| 04... | 1.7 | .00 | <.1 | 6366 |
| 18... | 1.5 | .07 | <.1 | 6366 |
| 31... | 1.9 | .00 | .0 | 6366 |
| JAN., 1975 | | | | |
| 15... | 2.5 | .03 | .1 | 6366 |
| FEB. | | | | |
| 03... | 1.4 | .03 | .1 | 6366 |

PROCESS DATE /03/75

09306022 - STEWART GULCH AB WEST FORK NR RIO BLANCO, CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | TIME | TYPE | DEPTH (FT) (00003) | TEMPERATURE (DEG C) (00010) | INSTANTANEOUS DISCHARGE (CFS) (00061) | TURBIDITY (JTU) (00070) | COLOR (PLATINUM-COBALT UNITS) (00080) | SPECIFIC CONDUCTANCE (MICROMHOS) (00095) | CHEMICAL OXYGEN DEMAND (HIGH LEVEL) (MG/L) (00340) | PH (UNITS) (00400) | CARBON DIOXIDE (CO2) (MG/L) (00405) | ALKALINITY AS CACO3 (MG/L) (00410) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEP., 1974 | | | | | | | | | | | | |
| 12... | 1300 | 2 | -- | 8.5 | 2.4 | -- | -- | 1420 | -- | -- | -- | 427 |
| 25... | 1115 | 2 | -- | 9.5 | 2.7 | -- | -- | 1400 | -- | -- | -- | 427 |
| 27... | 1015 | 2 | -- | 8.0 | 2.3 | -- | -- | 1410 | -- | -- | -- | 419 |
| OCT. | | | | | | | | | | | | |
| 04... | 1300 | 2 | -- | 10.0 | -- | -- | -- | 1350 | -- | -- | -- | 387 |
| 09... | 1230 | 2 | -- | 10.5 | 2.1 | -- | -- | 1370 | -- | -- | -- | 404 |
| 16... | 1200 | 2 | -- | 8.0 | 1.9 | -- | -- | 1360 | -- | -- | -- | 396 |
| 23... | 1130 | 2 | -- | 9.0 | 1.9 | -- | -- | 1400 | -- | -- | -- | 422 |
| 30... | 1400 | 2 | -- | 8.0 | 1.3 | -- | -- | 1370 | -- | -- | -- | 421 |
| NOV. | | | | | | | | | | | | |
| 06... | 1130 | 2 | -- | 8.0 | 2.1 | -- | -- | 1460 | -- | -- | -- | 436 |
| 21... | 0430 | 2 | -- | 6.0 | 2.4 | -- | -- | 1750 | -- | -- | -- | 641 |
| DEC. | | | | | | | | | | | | |
| 04... | 1100 | 2 | .4 | 5.0 | 2.4 | 30 | 3 | 1360 | 5 | 8.3 | 3.9 | 403 |
| 17... | 0915 | 2 | -- | 1.0 | 2.1 | 10 | 3 | 1300 | -- | -- | -- | 472 |

PROCESS DATE 02/03/75

09306022 - STEWART GULCH AB WEST FORK NR RIO BLANCO, CO.    DISTRICT CODE 08

WATER QUALITY DATA

| DATE | BICAR-BONATE (HCO3) (MG/L) (00440) | CAR-BONATE (CO3) (MG/L) (00445) | OIL AND GREASE (MG/L) (00550) | DIS-SOLVED AMMONIA NITRO-GEN (N) (MG/L) (00608) | DIS-SOLVED NITRITE (N) (MG/L) (00613) | DIS-SOLVED NITRATE (N) (MG/L) (00618) | TOTAL KJEL-DAHL NITRO-GEN (N) (MG/L) (00625) | DIS-SOLVED NITRITE PLUS NITRATE (N) (MG/L) (00631) | DIS-SOLVED ORTHO PHOS-PHATE (PO4) (MG/L) (00660) | TOTAL PHOS-PHORUS (P) (MG/L) (00665) | DIS-SOLVED ORTHO. PHOS-PHORUS (P) (MG/L) (00671) | CYANIDE (CN) (MG/L) (00720) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEP., 1974 | | | | | | | | | | | | |
| 12... | 520 | -- | -- | -- | -- | -- | -- | 1.5 | .03 | -- | .01 | -- |
| 20... | 520 | -- | -- | -- | -- | -- | -- | 1.5 | .03 | -- | .01 | -- |
| 27... | 511 | -- | -- | -- | -- | -- | -- | 1.6 | .03 | -- | .01 | -- |
| OCT. | | | | | | | | | | | | |
| 04... | 472 | -- | -- | -- | -- | -- | -- | 1.5 | .06 | -- | .02 | -- |
| 08... | 492 | -- | -- | -- | -- | -- | -- | 1.4 | .03 | -- | .01 | -- |
| 16... | 483 | -- | -- | -- | -- | -- | -- | 1.6 | .03 | -- | .01 | -- |
| 23... | 514 | -- | -- | -- | -- | -- | -- | 1.5 | .00 | -- | .00 | -- |
| 30... | 513 | -- | -- | -- | -- | -- | -- | 1.6 | .03 | -- | .01 | -- |
| NOV. | | | | | | | | | | | | |
| 06... | 531 | -- | -- | -- | -- | -- | -- | 1.7 | .09 | -- | .03 | -- |
| 20... | 762 | -- | -- | -- | -- | -- | -- | 1.6 | .03 | -- | .01 | -- |
| DEC. | | | | | | | | | | | | |
| 16... | 491 | 0 | 2 | .06 | .00 | 1.7 | .22 | 1.7 | .03 | .01 | .01 | .00 |
| 17... | 575 | 0 | 1 | .07 | .00 | -- | .32 | 1.7 | .03 | -- | .01 | .00 |

PROCESS DATE 02/03/75

09306022 - STEWART GULCH AB WEST FORK NR RIO BLANCO, CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | DIS-SOLVED SULFIDE (S) (MG/L) (00746) | HARDNESS (CA,MG) (MG/L) (00900) | NON-CARBONATE HARDNESS (MG/L) (00902) | DIS-SOLVED CALCIUM (CA) (MG/L) (00915) | DIS-SOLVED MAGNESIUM (MG) (MG/L) (00925) | DIS-SOLVED SODIUM (NA) (MG/L) (00930) | SODIUM AD-SORPTION RATIO (00931) | PERCENT SODIUM (00932) | DIS-SOLVED POTASSIUM (K) (MG/L) (00935) | DIS-SOLVED CHLORIDE (CL) (MG/L) (00940) | DIS-SOLVED SULFATE (SO4) (MG/L) (00945) | DIS-SOLVED FLUORIDE (F) (MG/L) (00950) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEP., 1974 | | | | | | | | | | | | |
| 12... | -- | 530 | 110 | 85 | 78 | 130 | 2.5 | 35 | 2.5 | 8.1 | 370 | .2 |
| 24... | -- | 570 | 150 | 95 | 82 | 120 | 2.2 | 31 | 2.5 | 7.8 | 370 | .3 |
| 27... | -- | 550 | 130 | 95 | 76 | 120 | 2.2 | 32 | 2.1 | 6.4 | 360 | .3 |
| OCT. | | | | | | | | | | | | |
| 04... | -- | 460 | 75 | 73 | 68 | 130 | 2.6 | 38 | 2.0 | 5.5 | 330 | .2 |
| 09... | -- | 560 | 150 | 98 | 76 | 120 | 2.2 | 32 | 1.6 | 6.3 | 380 | .2 |
| 16... | -- | 520 | 130 | 96 | 69 | 120 | 2.3 | 33 | 1.9 | 6.0 | 360 | .2 |
| 23... | -- | 530 | 100 | 95 | 70 | 120 | 2.3 | 33 | 1.9 | 6.6 | 350 | .3 |
| 30... | -- | 550 | 130 | 99 | 74 | 120 | 2.2 | 32 | 2.3 | 6.1 | 340 | .3 |
| NOV. | | | | | | | | | | | | |
| 16... | -- | 560 | 120 | 99 | 75 | 130 | 2.4 | 34 | 2.0 | 6.9 | 350 | .6 |
| 21... | -- | 490 | 0 | 89 | 64 | 250 | 4.9 | 53 | 2.4 | 16 | 330 | 3.3 |
| DEC. | | | | | | | | | | | | |
| 04... | .0 | 550 | 150 | 99 | 75 | 120 | 2.2 | 32 | 1.1 | 6.5 | 350 | .2 |
| 17... | .2 | 560 | 85 | 96 | 77 | 130 | 2.4 | 34 | 1.4 | 11 | 340 | 1.2 |

09306022 - STEWART GULCH AB WEST FORK NR RIO BLANCO, CO.    DISTRICT CODE 09

WATER QUALITY DATA

| DATE | DIS-SOLVED SILICA (SIO2) (MG/L) (00955) | DIS-SOLVED ARSENIC (AS) (UG/L) (01000) | DIS-SOLVED BARIUM (BA) (UG/L) (01005) | DIS-SOLVED BORON (B) (UG/L) (01020) | DIS-SOLVED CAD-MIUM (CD) (UG/L) (01025) | DIS-SOLVED CHRO-MIUM (CR) (UG/L) (01030) | DIS-SOLVED COPPER (CU) (UG/L) (01040) | DIS-SOLVED IRON (FE) (UG/L) (01046) | DIS-SOLVED LEAD (PB) (UG/L) (01049) | DIS-SOLVED MAN-GANESE (MN) (UG/L) (01056) | DIS-SOLVED ZINC (ZN) (UG/L) (01090) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SEP., 1974 | | | | | | | | | | | |
| 12... | 17 | 1 | 0 | 90 | 7 | -- | 5 | 50 | 2 | 0 | 10 |
| 26... | 15 | 1 | 0 | 70 | 2 | -- | 8 | 130 | 2 | 10 | 20 |
| 27... | 17 | 1 | 0 | 70 | <1 | -- | 1 | 40 | 2 | 0 | 10 |
| OCT. | | | | | | | | | | | |
| 04... | 16 | 1 | 0 | 110 | 0 | -- | 1 | 20 | 1 | 0 | 20 |
| 09... | 15 | 1 | <100 | 100 | <1 | -- | 0 | 50 | 2 | 10 | 40 |
| 16... | 16 | 1 | <100 | 50 | 0 | -- | 0 | 50 | 2 | 0 | 20 |
| 23... | 17 | 1 | 0 | 110 | 0 | -- | 0 | 20 | 1 | 0 | 20 |
| 30... | 17 | 0 | <100 | 30 | 0 | -- | 0 | 20 | 2 | 0 | 30 |
| NOV. | | | | | | | | | | | |
| 06... | 14 | 1 | <100 | 120 | 3 | -- | 2 | 620 | 3 | 20 | 90 |
| 2[illegible]... | 16 | 4 | <100 | 530 | 0 | -- | 0 | 20 | 2 | 0 | 370 |
| DEC. | | | | | | | | | | | |
| 04... | 15 | 1 | <100 | 90 | 1 | <10 | 5 | 10 | 5 | 20 | 30 |
| 17... | 15 | 2 | 100 | 260 | 1 | <10 | 1 | 10 | 1 | 0 | 20 |

09306022 - STEWART GULCH AB WEST FORK NR RIO BLANCO, CO.    DISTRICT CODE 08

WATER QUALITY DATA

| DATE | DIS-SOLVED LITHIUM (LI) (UG/L) (01130) | DIS-SOLVED SELE-NIUM (SE) (UG/L) (01145) | DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L) (70301) | DIS-SOLVED SOLIDS (TONS PER DAY) (70302) | DIS-SOLVED SOLIDS (TONS PER AC-FT) (70303) | TOTAL ORTHO PHOS-PHORUS (P) (MG/L) (70507) | DIS_SOLVED AMMONIA (NH4) (MG/L) (71846) | TOTAL NITRATE (NO3) (MG/L) (71850) | DIS_SOLVED NITRATE (NO3) (MG/L) (71851) | DIS_SOLVED NITRITE (NO2) (MG/L) (71856) | DIS-SOLVED MERCURY (HG) (UG/L) (71890) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SEP., 1974 | | | | | | | | | | | |
| 12... | 0 | 1 | 954 | 6.36 | 1.30 | -- | -- | -- | -- | -- | .0 |
| 20... | 0 | 1 | 956 | 7.12 | 1.30 | -- | -- | -- | -- | -- | .0 |
| 27... | 0 | 1 | 936 | 5.99 | 1.27 | -- | -- | -- | -- | -- | .0 |
| OCT. | | | | | | | | | | | |
| 02... | 0 | 1 | 865 | -- | 1.18 | -- | -- | -- | -- | -- | .0 |
| 09... | 0 | 1 | 946 | 5.41 | 1.29 | -- | -- | -- | -- | -- | .0 |
| 16... | 0 | 0 | 915 | 4.92 | 1.24 | -- | -- | -- | -- | -- | .0 |
| 23... | 0 | 1 | 921 | 4.55 | 1.25 | -- | -- | -- | -- | -- | .0 |
| 30... | 0 | 1 | 919 | 3.25 | 1.25 | -- | -- | -- | -- | -- | .0 |
| NOV. | | | | | | | | | | | |
| 06... | 0 | 1 | 950 | 5.39 | 1.29 | -- | -- | -- | -- | -- | .0 |
| 20... | 40 | 2 | 1160 | 7.70 | 1.58 | -- | -- | -- | -- | -- | .0 |
| DEC. | | | | | | | | | | | |
| 04... | <10 | 1 | 927 | 6.01 | 1.26 | .04 | .08 | -- | 7.5 | .00 | <.1 |
| 17... | 20 | 1 | 963 | 5.46 | 1.31 | .03 | .09 | 7.5 | -- | .00 | <.1 |

09306022 - STEWART GULC[illegible] WEST FORK NR RIO BLANCO, CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | TIME | TYPE | DEPTH (FT) (00003) | TEMPER-ATURE (DEG C) (00010) | INSTAN-TANEOUS DIS-CHARGE (CFS) (00061) | TUR-BID-ITY (JTU) (00070) | COLOR (PLAT-INUM-COBALT UNITS) (00080) | SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS) (00095) | CHEM-ICAL OXYGEN DEMAND (HIGH LEVEL) (MG/L) (00340) | PH (UNITS) (00400) | CARBON DIOXIDE (CO2) (MG/L) (00405) | ALKA-LINITY AS CACO3 (MG/L) (00410) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEP., 1974 | | | | | | | | | | | | |
| 12... | 1300 | 2 | -- | 8.5 | 2.4 | -- | -- | 1420 | -- | -- | -- | 427 |
| 20... | 1115 | 2 | -- | 9.5 | 2.7 | -- | -- | 1400 | -- | -- | -- | 427 |
| 27... | 1015 | 2 | -- | 8.0 | 2.3 | -- | -- | 1410 | -- | -- | -- | 419 |
| OCT. | | | | | | | | | | | | |
| 04... | 1300 | 2 | -- | 10.0 | -- | -- | -- | 1350 | -- | -- | -- | 387 |
| 09... | 1230 | 2 | -- | 10.5 | 2.1 | -- | -- | 1370 | -- | -- | -- | 404 |
| 16... | 1200 | 2 | -- | 8.0 | 1.9 | -- | -- | 1360 | -- | -- | -- | 395 |
| 23... | 1130 | 2 | -- | 9.0 | 1.8 | -- | -- | 1400 | -- | -- | -- | 422 |
| 30... | 1400 | 2 | -- | 8.0 | 1.3 | -- | -- | 1370 | -- | -- | -- | 421 |
| NOV. | | | | | | | | | | | | |
| 06... | 1130 | 2 | -- | 8.0 | 2.1 | -- | -- | 1460 | -- | -- | -- | 436 |
| 20... | 0930 | 2 | -- | 6.0 | 2.4 | -- | -- | 1750 | -- | -- | -- | 641 |
| DEC. | | | | | | | | | | | | |
| 04... | 1100 | 2 | .4 | 5.0 | 2.4 | 30 | 3 | 1360 | 5 | 8.3 | 3.9 | 403 |
| 17... | 0915 | 2 | -- | 1.0 | 2.1 | 10 | 3 | 1200 | -- | 8.4 | 3.7 | 472 |
| 30... | 1315 | 2 | -- | 6.0 | 2.0 | 3 | 3 | 750 | -- | 8.2 | 5.0 | 405 |
| JAN., 1975 | | | | | | | | | | | | |
| 15... | -- | 2 | -- | 4.5 | 2.3 | 8 | 5 | 1400 | -- | 7.2 | 51 | 418 |
| FEB. | | | | | | | | | | | | |
| 03... | 1030 | 2 | -- | 6.0 | 1.7 | 5 | 3 | 1400 | -- | 8.8 | 1.3 | 426 |

PROCESS DATE [illegible]/03/75

09306022 - STEWART GULCH [illegible] WEST FORK NR RIO BLANCO, CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | BICAR-BONATE (HCO3) (MG/L) (00440) | CAR-BONATE (CO3) (MG/L) (00445) | OIL AND GREASE (MG/L) (00550) | DIS-SOLVED AMMONIA NITRO-GEN (N) (MG/L) (00608) | DIS-SOLVED NITRITE (N) (MG/L) (00613) | DIS-SOLVED NITRATE (N) (MG/L) (00618) | TOTAL KJEL-DAHL NITRO-GEN (N) (MG/L) (00625) | DIS-SOLVED NITRITE PLUS NITRATE (N) (MG/L) (00631) | DIS-SOLVED ORTHO PHOS-PHATE (PO4) (MG/L) (00660) | TOTAL PHOS-PHORUS (P) (MG/L) (00665) | DIS-SOLVED ORTHO. PHOS-PHORUS (P) (MG/L) (00671) | CYANIDE (CN) (MG/L) (00720) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEP., 1974 | | | | | | | | | | | | |
| 12... | 520 | -- | -- | -- | -- | -- | -- | 1.5 | .03 | -- | .01 | -- |
| 20... | 520 | -- | -- | -- | -- | -- | -- | 1.5 | .03 | -- | .01 | -- |
| 27... | 511 | -- | -- | -- | -- | -- | -- | 1.6 | .03 | -- | .01 | -- |
| OCT. | | | | | | | | | | | | |
| 04... | 472 | -- | -- | -- | -- | -- | -- | 1.5 | .06 | -- | .02 | -- |
| 09... | 492 | -- | -- | -- | -- | -- | -- | 1.4 | .03 | -- | .01 | -- |
| 16... | 483 | -- | -- | -- | -- | -- | -- | 1.6 | .03 | -- | .01 | -- |
| 23... | 514 | -- | -- | -- | -- | -- | -- | 1.5 | .00 | -- | .00 | -- |
| 30... | 513 | -- | -- | -- | -- | -- | -- | 1.6 | .03 | -- | .01 | -- |
| NOV. | | | | | | | | | | | | |
| 05... | 531 | -- | -- | -- | -- | -- | -- | 1.7 | .09 | -- | .03 | -- |
| 20... | 782 | -- | -- | -- | -- | -- | -- | 1.6 | .03 | -- | .01 | -- |
| DEC. | | | | | | | | | | | | |
| 04... | 491 | 0 | 2 | .06 | .00 | 1.7 | .22 | 1.7 | .03 | .01 | .01 | .00 |
| 17... | 575 | 0 | 1 | .07 | .00 | 1.7 | .32 | 1.7 | .03 | .06 | .01 | .00 |
| 30... | 494 | 0 | 1 | .09 | .00 | 1.8 | .14 | 1.8 | .15 | .05 | .05 | .00 |
| JAN., 1975 | | | | | | | | | | | | |
| 15... | 510 | 0 | 7 | .03 | .01 | 1.8 | .40 | 1.8 | .03 | .02 | .01 | .00 |
| FEB. | | | | | | | | | | | | |
| 03... | 519 | 0 | 9 | .06 | .01 | 1.9 | .45 | 1.9 | .12 | .13 | .04 | .01 |

09306022 - STEWART GULC 3 WEST FORK NR RIO BLANCO, CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | DIS-SOL-VED SUL-FIDE (S) (MG/L) (00745) | HARD-NESS (CA,MG) (MG/L) (00900) | NON-CAR-BONATE HARD-NESS (MG/L) (00902) | DIS-SOLVED CAL-CIUM (CA) (MG/L) (00915) | DIS-SOLVED MAG-NE-SIUM (MG) (MG/L) (00925) | DIS-SOLVED SODIUM (NA) (MG/L) (00930) | SODIUM AD-SORP-TION RATIO (00931) | PERCENT SODIUM (00932) | DIS-SOLVED PO-TAS-SIUM (K) (MG/L) (00935) | DIS-SOLVED CHLO-RIDE (CL) (MG/L) (00940) | DIS-SOLVED SULFATE (SO4) (MG/L) (00945) | DIS-SOLVED FLUO-RIDE (F) (MG/L) (00950) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEP., 1974 | | | | | | | | | | | | |
| 12... | -- | 530 | 110 | 85 | 78 | 130 | 2.5 | 35 | 2.5 | 8.1 | 370 | .2 |
| 20... | -- | 570 | 150 | 95 | 82 | 120 | 2.2 | 31 | 2.5 | 7.9 | 370 | .3 |
| 27... | -- | 550 | 130 | 95 | 76 | 120 | 2.2 | 32 | 2.1 | 6.4 | 360 | .3 |
| OCT. | | | | | | | | | | | | |
| 04... | -- | 460 | 75 | 73 | 68 | 130 | 2.6 | 33 | 2.0 | 6.5 | 330 | .2 |
| 09... | -- | 560 | 150 | 96 | 76 | 120 | 2.2 | 32 | 1.6 | 6.3 | 380 | .2 |
| 16... | -- | 520 | 130 | 96 | 69 | 120 | 2.3 | 33 | 1.9 | 6.0 | 360 | .2 |
| 23... | -- | 530 | 130 | 95 | 70 | 120 | 2.3 | 33 | 1.9 | 6.6 | 350 | .3 |
| 30... | -- | 550 | 130 | 99 | 74 | 120 | 2.2 | 32 | 2.3 | 6.1 | 340 | .3 |
| NOV. | | | | | | | | | | | | |
| 06... | -- | 550 | 120 | 99 | 75 | 130 | 2.4 | 34 | 2.0 | 6.9 | 350 | .6 |
| 20... | -- | 440 | 0 | 89 | 64 | 250 | 4.9 | 53 | 2.4 | 16 | 330 | 3.3 |
| DEC. | | | | | | | | | | | | |
| 04... | .0 | 560 | 150 | 99 | 75 | 120 | 2.2 | 32 | 1.1 | 6.5 | 360 | .2 |
| 17... | .2 | 560 | 85 | 96 | 77 | 130 | 2.4 | 34 | 1.4 | 11 | 340 | 1.2 |
| 30... | .7 | 530 | 130 | 97 | 71 | 120 | 2.3 | 33 | 2.0 | 7.5 | 370 | .2 |
| JAN., 1975 | | | | | | | | | | | | |
| 15... | .2 | 550 | 130 | 93 | 76 | 120 | 2.2 | 32 | 1.7 | 6.7 | 380 | .2 |
| FEB. | | | | | | | | | | | | |
| 03... | .1 | 570 | 140 | 98 | 78 | 120 | 2.2 | 32 | 1.6 | 7.0 | 370 | .4 |

09306022 - STEWART GULCH WEST FORK NR RIO BLANCO, CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | DIS-SOLVED SILICA (SIO2) (MG/L) (00955) | DIS-SOLVED ARSENIC (AS) (UG/L) (01000) | DIS-SOLVED BARIUM (BA) (UG/L) (01005) | DIS-SOLVED BORON (B) (UG/L) (01020) | DIS-SOLVED CAD-MIUM (CD) (UG/L) (01025) | DIS-SOLVED CHRO-MIUM (CR) (UG/L) (01030) | DIS-SOLVED COPPER (CU) (UG/L) (01040) | DIS-SOLVED IRON (FE) (UG/L) (01046) | DIS-SOLVED LEAD (PB) (UG/L) (01049) | DIS-SOLVED MAN-GANESE (MN) (UG/L) (01056) | DIS-SOLVED ZINC (ZN) (UG/L) (01090) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SEP., 1974 | | | | | | | | | | | |
| 12... | 17 | 1 | 0 | 90 | 7 | -- | 5 | 50 | 2 | 0 | 10 |
| 20... | 15 | 1 | 0 | 70 | 2 | -- | 8 | 130 | 2 | 10 | 20 |
| 27... | 17 | 1 | 0 | 70 | <1 | -- | 1 | 40 | 2 | 0 | 10 |
| OCT. | | | | | | | | | | | |
| 04... | 16 | 1 | 0 | 110 | 0 | -- | 1 | 20 | 1 | 0 | 20 |
| 09... | 15 | 1 | <100 | 100 | <1 | -- | 0 | 50 | 2 | 10 | 40 |
| 16... | 16 | 1 | <100 | 50 | 0 | -- | 0 | 50 | 2 | 0 | 20 |
| 23... | 17 | 1 | 0 | 110 | 0 | -- | 0 | 20 | 1 | 0 | 20 |
| 30... | 17 | 0 | <100 | 30 | 0 | -- | 0 | 20 | 2 | 0 | 30 |
| NOV. | | | | | | | | | | | |
| 05... | 16 | 1 | <100 | 120 | 3 | -- | 2 | 620 | 3 | 20 | 90 |
| 20... | 16 | 4 | <100 | 530 | 0 | -- | 0 | 20 | 2 | 0 | 370 |
| DEC. | | | | | | | | | | | |
| 04... | 15 | 1 | <100 | 90 | 1 | <10 | 5 | 10 | 5 | 20 | 30 |
| 17... | 15 | 2 | 100 | 260 | 1 | <10 | 1 | 10 | 1 | 0 | 20 |
| 30... | 15 | 0 | <100 | 80 | 0 | 0 | 1 | 20 | 2 | 0 | 20 |
| JAN., 1975 | | | | | | | | | | | |
| 15... | 15 | 1 | 100 | 120 | 1 | 10 | 3 | 10 | 7 | 10 | 20 |
| FEB. | | | | | | | | | | | |
| 03... | 16 | 3 | <100 | 70 | 1 | 0 | 5 | 10 | 6 | 40 | 20 |

09306022 - STEWART GULCH AB WEST FORK NR RIO BLANCO, CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | DIS-SOLVED LITHIUM (LI) (UG/L) (01130) | DIS-SOLVED SELE-NIUM (SE) (UG/L) (01145) | DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L) (70301) | DIS-SOLVED SOLIDS (TONS PER DAY) (70302) | DIS-SOLVED SOLIDS (TONS PER AC-FT) (70303) | TOTAL ORTHO PHOS-PHORUS (P) (MG/L) (70507) | DIS_SOLVED AMMONIA (NH4) (MG/L) (71846) | TOTAL NITRATE (NO3) (MG/L) (71850) | DIS_SOLVED NITRATE (NO3) (MG/L) (71851) | DIS_SOLVED NITRITE (NO2) (MG/L) (71856) | DIS-SOLVED MERCURY (HG) (UG/L) (71890) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SEP., 1974 | | | | | | | | | | | |
| 12... | 0 | 1 | 954 | 6.36 | 1.30 | -- | -- | -- | -- | -- | .0 |
| 20... | 0 | 1 | 956 | 7.12 | 1.30 | -- | -- | -- | -- | -- | .0 |
| 27... | 0 | 1 | 936 | 5.99 | 1.27 | -- | -- | -- | -- | -- | .0 |
| OCT. | | | | | | | | | | | |
| 04... | 0 | 1 | 865 | -- | 1.18 | -- | -- | -- | -- | -- | .0 |
| 09... | 0 | 1 | 946 | 5.41 | 1.29 | -- | -- | -- | -- | -- | .0 |
| 16... | 0 | 0 | 915 | 4.92 | 1.24 | -- | -- | -- | -- | -- | .0 |
| 23... | 0 | 1 | 921 | 4.55 | 1.25 | -- | -- | -- | -- | -- | .0 |
| 30... | 0 | 1 | 919 | 3.25 | 1.25 | -- | -- | -- | -- | -- | .0 |
| NOV. | | | | | | | | | | | |
| 06... | 0 | 1 | 950 | 5.39 | 1.29 | -- | -- | -- | -- | -- | .0 |
| 20... | 40 | 2 | 1160 | 7.70 | 1.58 | -- | -- | -- | -- | -- | .0 |
| DEC. | | | | | | | | | | | |
| 04... | <10 | 1 | 927 | 6.01 | 1.26 | .04 | .08 | -- | 7.5 | .00 | <.1 |
| 17... | 20 | 1 | 963 | 5.49 | 1.31 | .03 | .09 | 7.5 | 7.5 | .00 | <.1 |
| 30... | 10 | 1 | 936 | 5.18 | 1.27 | .03 | .12 | -- | 8.0 | .00 | .0 |
| JAN., 1975 | | | | | | | | | | | |
| 15... | 10 | 1 | 953 | 6.12 | 1.30 | .03 | .04 | -- | 7.9 | .03 | .0 |
| FEB. | | | | | | | | | | | |
| 03... | 10 | 1 | 956 | 4.44 | 1.30 | .18 | .08 | -- | 8.4 | .03 | .0 |

PROCESS DATE [illegible]03/75

09306025 - WEST FORK STEWART GULCH NEAR RIO BLANCO, CO.      DISTRICT CODE 08

WATER QUALITY DATA

| DATE | TIME | TYPE | SAMPLE NUMBER (00008) | TEMPER-ATURE (DEG C) (00010) | DIS-CHARGE (CFS) (00060) | INSTAN-TANEOUS DIS-CHARGE (CFS) (00061) | SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS) (00095) | PH (UNITS) (00400) | CARBON DIOXIDE (CO2) (MG/L) (00405) | ALKA-LINITY AS CACO3 (MG/L) (00410) | BICAR-BONATE (HCO3) (MG/L) (00440) | CAR-BONATE (CO3) (MG/L) (00445) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAY , 1974 | | | | | | | | | | | | |
| 03... | 1300 | 2 | -- | 20.0 | -- | -- | 1740 | 8.3 | 4.7 | 482 | 588 | 0 |
| 17... | 1000 | 2 | -- | 11.0 | -- | .03 | 1620 | 8.0 | 8.9 | 459 | 559 | 0 |
| 22... | 1240 | 2 | 1882 | 21.0 | -- | .06 | 1640 | 8.2 | 5.4 | 437 | 533 | 0 |
| 31... | 1345 | 2 | -- | 26.0 | -- | -- | 1630 | 8.2 | 5.6 | 451 | 550 | 0 |
| JUNE | | | | | | | | | | | | |
| 14... | 1230 | 2 | -- | 30.0 | .02 | -- | 1570 | 8.4 | 3.2 | 418 | 499 | 5 |
| 21... | 1330 | 2 | -- | 30.0 | -- | -- | 1530 | 8.5 | 2.4 | 381 | 438 | 13 |
| 26... | 1140 | 2 | -- | 25.0 | -- | .02 | 1540 | 8.2 | 4.6 | 374 | 456 | 0 |
| JULY | | | | | | | | | | | | |
| 02... | 0700 | 2 | -- | 10.0 | -- | .03 | 1630 | 8.1 | 6.9 | 445 | 543 | 0 |
| 11... | 1415 | 2 | -- | 27.0 | -- | .02 | 1580 | 8.3 | 3.7 | 376 | 459 | 0 |
| 26... | 1415 | 2 | -- | 26.0 | -- | .02 | 1610 | 8.1 | 6.6 | 426 | 519 | 0 |
| AUG. | | | | | | | | | | | | |
| 03... | 0840 | 2 | -- | 12.5 | -- | .02 | 1640 | 8.1 | 6.8 | 436 | 532 | 0 |
| 1[illegible]... | 1005 | 2 | -- | 8.0 | -- | .02 | 1730 | 8.2 | 6.1 | 495 | 603 | 0 |
| SEP. | | | | | | | | | | | | |
| 12... | 1200 | 2 | -- | 8.0 | -- | .02 | 2010 | -- | -- | 545 | 654 | -- |
| 27... | 0945 | 2 | -- | 5.0 | -- | .04 | 1610 | -- | -- | 445 | 542 | -- |
| OCT. | | | | | | | | | | | | |
| 03... | 1210 | 2 | -- | 11.0 | -- | -- | 1730 | -- | -- | 460 | 551 | -- |
| 09... | 1120 | 2 | -- | 12.0 | -- | .03 | 1590 | -- | -- | 428 | 522 | -- |
| 15... | 1320 | 2 | -- | 14.0 | -- | .07 | 1570 | -- | -- | 413 | 504 | -- |
| 23... | 1030 | 2 | -- | 7.0 | -- | .06 | 1620 | -- | -- | 444 | 541 | -- |
| 31... | 1155 | 2 | -- | 5.0 | -- | .15 | 1580 | -- | -- | 393 | 479 | -- |
| NOV. | | | | | | | | | | | | |
| 06... | 1330 | 2 | -- | 13.5 | -- | .13 | 1460 | -- | -- | 400 | 488 | -- |

09306025 - WEST FORK STEWART GULCH NEAR RIO BLANCO. CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | DIS-SOLVED NITRITE PLUS NITRATE (N) (MG/L) (00631) | DIS-SOLVED ORTHO PHOS-PHATE (PO4) (MG/L) (00660) | DIS-SOLVED ORTHO. PHOS-PHORUS (P) (MG/L) (00671) | HARD-NESS (CA,MG) (MG/L) (00900) | NON-CAR-BONATE HARD-NESS (MG/L) (00902) | DIS-SOLVED CAL-CIUM (CA) (MG/L) (00915) | DIS-SOLVED MAG-NE-SIUM (MG) (MG/L) (00925) | DIS-SOLVED SODIUM (NA) (MG/L) (00930) | SODIUM AD-SORP-TION RATIO (00931) | PERCENT SODIUM (00932) | DIS-SOLVED PO-TAS-SIUM (K) (MG/L) (00935) | DIS-SOLVED CHLO-RIDE (CL) (MG/L) (00940) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAY , 1974 | | | | | | | | | | | | |
| 03... | .16 | .03 | .01 | 690 | 200 | 110 | 100 | 160 | 2.7 | 33 | 7.0 | 10 |
| 17... | .08 | .06 | .02 | 660 | 200 | 100 | 100 | 160 | 2.7 | 34 | 2.8 | 8.8 |
| 22... | .02 | .06 | .02 | 650 | 210 | 95 | 100 | 160 | 2.7 | 35 | 2.7 | 8.6 |
| 31... | .04 | .12 | .04 | 650 | 200 | 96 | 99 | 150 | 2.6 | 33 | 2.5 | 10 |
| JUNE | | | | | | | | | | | | |
| 14... | .03 | .00 | .00 | 610 | 190 | 88 | 95 | 150 | 2.6 | 35 | 2.7 | 9.1 |
| 21... | .03 | .03 | .01 | 580 | 200 | 79 | 94 | 150 | 2.7 | 35 | 1.9 | 8.5 |
| 25... | .01 | .05 | .02 | 620 | 250 | 88 | 97 | 150 | 2.6 | 34 | 2.1 | 7.6 |
| JULY | | | | | | | | | | | | |
| 02... | .03 | .06 | .02 | 700 | 250 | 98 | 110 | 150 | 2.5 | 32 | 1.2 | 8.2 |
| 11... | .25 | .12 | .04 | 610 | 230 | 78 | 100 | 160 | 2.8 | 36 | 1.5 | 8.8 |
| 26... | .03 | .09 | .03 | 640 | 220 | 92 | 100 | 170 | 2.9 | 36 | 2.4 | 10 |
| AUG. | | | | | | | | | | | | |
| 13... | .02 | .06 | .02 | 650 | 220 | 96 | 100 | 150 | 2.6 | 33 | 1.5 | 8.6 |
| [illegible]... | .37 | .09 | .03 | 700 | 200 | 97 | 110 | 160 | 2.6 | 33 | 3.3 | 12 |
| SEP. | | | | | | | | | | | | |
| 12... | .01 | .00 | .00 | 740 | 200 | 100 | 120 | 220 | 3.5 | 39 | 9.3 | 29 |
| 27... | .08 | .03 | .01 | 660 | 210 | 98 | 100 | 150 | 2.5 | 33 | 4.2 | 9.7 |
| OCT. | | | | | | | | | | | | |
| 03... | .02 | .03 | .01 | 590 | 130 | 77 | 96 | 180 | 3.2 | 40 | 6.4 | 19 |
| 09... | .02 | .03 | .01 | 580 | 150 | 77 | 94 | 150 | 2.7 | 36 | 1.9 | 11 |
| 16... | .02 | .00 | .00 | 610 | 190 | 94 | 90 | 150 | 2.7 | 35 | 4.1 | 10 |
| 23... | .01 | .00 | .00 | 620 | 190 | 100 | 91 | 160 | 2.8 | 36 | 4.6 | 11 |
| 30... | .08 | .03 | .01 | 550 | 140 | 48 | 100 | 160 | 3.0 | 39 | 4.9 | 12 |
| NOV. | | | | | | | | | | | | |
| 06... | .12 | .06 | .02 | 550 | 150 | 82 | 84 | 130 | 2.4 | 34 | 3.1 | 9.4 |

09306025 - WEST FORK STEWART GULCH NEAR RIO BLANCO, CO.  DISTRICT CODE 08

WATER QUALITY DATA

| DATE | DIS-SOLVED SULFATE (SO4) (MG/L) (00945) | DIS-SOLVED FLUO-RIDE (F) (MG/L) (00950) | DIS-SOLVED SILICA (SIO2) (MG/L) (00955) | DIS-SOLVED ARSENIC (AS) (UG/L) (01000) | DIS-SOLVED BARIUM (BA) (UG/L) (01005) | DIS-SOLVED BERYL-LIUM (BE) (UG/L) (01010) | DIS-SOLVED BISMUTH (BI) (UG/L) (01015) | DIS-SOLVED BORON (B) (UG/L) (01020) | DIS-SOLVED CAD-MIUM (CD) (UG/L) (01025) | DIS-SOLVED CHRO-MIUM (CR) (UG/L) (01030) | DIS-SOLVED COBALT (CO) (UG/L) (01035) | DIS-SOLVED COPPER (CU) (UG/L) (01040) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAY , 1974 | | | | | | | | | | | | |
| 13... | 540 | .2 | 14 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 17... | 520 | .3 | 10 | 0 | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | 510 | .1 | 8.9 | 1 | 50 | <7 | <15 | 90 | 0 | <10 | <20 | <5 |
| 31... | 490 | 1.2 | 12 | 2 | 100 | -- | -- | 130 | 1 | -- | -- | 4 |
| JUNE | | | | | | | | | | | | |
| 14... | 470 | .2 | 15 | 3 | 200 | -- | -- | 130 | 1 | -- | -- | 6 |
| 21... | 440 | .0 | 15 | 2 | 0 | -- | -- | 130 | 1 | -- | -- | 2 |
| 26... | 470 | .2 | 15 | 1 | <100 | -- | -- | 100 | 2 | -- | -- | 3 |
| JULY | | | | | | | | | | | | |
| 02... | 470 | .1 | 16 | 3 | <100 | -- | -- | 90 | 0 | -- | -- | 4 |
| 11... | 540 | .2 | 16 | 3 | <100 | -- | -- | 120 | 2 | -- | -- | 2 |
| 26... | 510 | .2 | 17 | 0 | 0 | -- | -- | 160 | 1 | -- | -- | 8 |
| AUG. | | | | | | | | | | | | |
| 13... | 530 | .2 | 17 | 1 | 0 | -- | -- | 110 | 1 | -- | -- | 2 |
| 1[illegible]... | 540 | .2 | 18 | 1 | 0 | -- | -- | 120 | 2 | -- | -- | 5 |
| SEP. | | | | | | | | | | | | |
| 12... | 580 | .1 | 17 | 2 | 0 | -- | -- | 150 | <1 | -- | -- | 8 |
| 27... | 460 | .2 | 17 | 1 | 0 | -- | -- | 80 | 2 | -- | -- | 1 |
| OCT. | | | | | | | | | | | | |
| 03... | 450 | .2 | 14 | 2 | 0 | -- | -- | 150 | 0 | -- | -- | 6 |
| 04... | 430 | .2 | 14 | 1 | 0 | -- | -- | 110 | <1 | -- | -- | 2 |
| 10... | 440 | .2 | 13 | 1 | <100 | -- | -- | 80 | 0 | -- | -- | 0 |
| 23... | 470 | .2 | 14 | 1 | 0 | -- | -- | 130 | 0 | -- | -- | 0 |
| 31... | 450 | .2 | 14 | 0 | <100 | -- | -- | 40 | 0 | -- | -- | 0 |
| NOV. | | | | | | | | | | | | |
| 05... | 380 | .2 | 13 | 1 | <100 | -- | -- | 90 | 1 | -- | -- | 1 |

PROCESS DATE 0[illegible]3/75

09306025 - WEST FORK STEWART GULCH NEAR RIO BLANCO, CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | DIS-SOLVED IRON (FE) (UG/L) (01046) | DIS-SOLVED LEAD (PB) (UG/L) (01049) | DIS-SOLVED MAN-GANESE (MN) (UG/L) (01056) | DIS-SOLVED MOLYB-DENUM (MO) (UG/L) (01060) | DIS-SOLVED NICKEL (NI) (UG/L) (01065) | DIS-SOLVED SILVER (AG) (UG/L) (01075) | DIS-SOLVED STRON-TIUM (SR) (UG/L) (01080) | DIS-SOLVED VANA-DIUM (V) (UG/L) (01085) | DIS-SOLVED ZINC (ZN) (UG/L) (01090) | DIS-SOLVED TIN (SN) (UG/L) (01100) | DIS-SOLVED ALUM-INUM (AL) (UG/L) (01106) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MAY , 1974 | | | | | | | | | | | |
| 03... | 40 | -- | 0 | -- | -- | -- | -- | -- | -- | -- | -- |
| 17... | 30 | -- | 20 | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | 50 | <20 | 0 | <7 | <10 | <3 | 3200 | <10 | <10 | <15 | 40 |
| 31... | 50 | 6 | 10 | -- | -- | -- | -- | -- | 20 | -- | -- |
| JUNE | | | | | | | | | | | |
| 14... | 20 | 10 | 0 | -- | -- | -- | -- | -- | 20 | -- | -- |
| 21... | 30 | 2 | 0 | -- | -- | -- | -- | -- | 20 | -- | -- |
| 26... | 50 | 4 | 10 | -- | -- | -- | -- | -- | 10 | -- | -- |
| JULY | | | | | | | | | | | |
| 02... | 40 | 0 | 0 | -- | -- | -- | -- | -- | 30 | -- | -- |
| 11... | 20 | 7 | 10 | -- | -- | -- | -- | -- | 10 | -- | -- |
| 21... | 50 | 4 | 20 | -- | -- | -- | -- | -- | 10 | -- | -- |
| AUG. | | | | | | | | | | | |
| 03... | 190 | 6 | 0 | -- | -- | -- | -- | -- | 20 | -- | -- |
| [illegible]... | 80 | 2 | 10 | -- | -- | -- | -- | -- | 30 | -- | -- |
| SEP. | | | | | | | | | | | |
| 12... | 120 | 2 | 0 | -- | -- | -- | -- | -- | 10 | -- | -- |
| 27... | 60 | 2 | 0 | -- | -- | -- | -- | -- | 10 | -- | -- |
| OCT. | | | | | | | | | | | |
| 03... | 40 | 1 | 0 | -- | -- | -- | -- | -- | 20 | -- | -- |
| 07... | 60 | 3 | 0 | -- | -- | -- | -- | -- | 40 | -- | -- |
| 16... | 20 | 3 | 0 | -- | -- | -- | -- | -- | 20 | -- | -- |
| 23... | 20 | 0 | 10 | -- | -- | -- | -- | -- | 10 | -- | -- |
| 30... | 30 | 1 | 0 | -- | -- | -- | -- | -- | 20 | -- | -- |
| NOV. | | | | | | | | | | | |
| 06... | 210 | 3 | 0 | -- | -- | -- | -- | -- | 40 | -- | -- |

PROCESS DATE 02/03/75

09306025 - WEST FORK STEWART GULCH NEAR RIO BLANCO, CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | DIS-SOLVED GALLIUM (GA) (UG/L) (01120) | DIS-SOLVED GER-MANIUM (GE) (UG/L) (01125) | DIS-SOLVED LIT-IUM (LI) (UG/L) (01130) | DIS-SOLVED SELE-NIUM (SE) (UG/L) (01145) | DIS-SOLVED TI-TANIUM (TI) (UG/L) (01150) | DIS-SOLVED ZIR-CONIUM (ZR) (UG/L) (01160) | DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L) (70301) | DIS-SOLVED SOLIDS (TONS PER DAY) (70302) | DIS-SOLVED SOLIDS (TONS PER AC-FT) (70303) | DIS-SOLVED MERCURY (HG) (UG/L) (71890) | ELEV. OF LAND SURFACE DATUM (FT. ABOVE MSL) (72000) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MAY , 1974 | | | | | | | | | | | |
| 03... | -- | -- | -- | -- | -- | -- | 1230 | -- | 1.67 | -- | 6568 |
| 17... | -- | -- | -- | 0 | -- | -- | 1180 | .10 | 1.60 | .0 | 6568 |
| 22... | <10 | <20 | 10 | 0 | <10 | <30 | 1150 | .19 | 1.56 | .0 | 6568 |
| 31... | -- | -- | 10 | 0 | -- | -- | 1130 | -- | 1.54 | .0 | 6568 |
| JUNE | | | | | | | | | | | |
| 14... | -- | -- | 10 | 1 | -- | -- | 1080 | .06 | 1.47 | .0 | 6568 |
| 21... | -- | -- | 20 | 1 | -- | -- | 1060 | -- | 1.44 | .0 | 6568 |
| 26... | -- | -- | 10 | 1 | -- | -- | 1060 | .05 | 1.44 | .9 | 6568 |
| JULY | | | | | | | | | | | |
| 02... | -- | -- | 0 | 0 | -- | -- | 1120 | .09 | 1.52 | .0 | 6568 |
| 11... | -- | -- | 0 | 0 | -- | -- | 1130 | .05 | 1.54 | .0 | 6568 |
| 2[illegible]... | -- | -- | 10 | 1 | -- | -- | 1160 | .05 | 1.58 | .0 | 6568 |
| AUG. | | | | | | | | | | | |
| 03... | -- | -- | 0 | 0 | -- | -- | 1170 | .05 | 1.59 | .0 | 6568 |
| 1[illegible]... | -- | -- | 0 | 1 | -- | -- | 1240 | .07 | 1.69 | .0 | 6568 |
| SEP. | | | | | | | | | | | |
| 12... | -- | -- | 0 | 1 | -- | -- | 1400 | .08 | 1.90 | .0 | 6568 |
| 27... | -- | -- | 0 | 0 | -- | -- | 1130 | .12 | 1.54 | .0 | 6568 |
| OCT. | | | | | | | | | | | |
| 03... | -- | -- | 0 | 0 | -- | -- | 1150 | -- | 1.56 | .0 | 6568 |
| 09... | -- | -- | 0 | 0 | -- | -- | 1040 | .03 | 1.41 | .0 | 6568 |
| 16... | -- | -- | 0 | 0 | -- | -- | 1090 | .21 | 1.48 | .0 | 6568 |
| 23... | -- | -- | 0 | 0 | -- | -- | 1120 | .13 | 1.52 | .0 | 6568 |
| 30... | -- | -- | 0 | 0 | -- | -- | 1030 | .42 | 1.40 | .0 | 6568 |
| NOV. | | | | | | | | | | | |
| 05... | -- | -- | 0 | 5 | -- | -- | 943 | .33 | 1.28 | .0 | 6568 |

09306025 - WEST FORK ST RT GULCH NEAR RIO BLANCO, CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | TIME | TYPE | SAMPLE NUMBER (00008) | TEMPER-ATURE (DEG C) (00010) | DIS-CHARGE (CFS) (00060) | INSTAN-TANEOUS DIS-CHARGE (CFS) (00061) | SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS) (00095) | PH (UNITS) (00400) | CARBON DIOXIDE (CO2) (MG/L) (00405) | ALKA-LINITY AS CACO3 (MG/L) (00410) | BICAR-BONATE (HCO3) (MG/L) (00440) | CAR-BONATE (CO3) (MG/L) (00445) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAY , 1974 | | | | | | | | | | | | |
| 03... | 1300 | 2 | -- | 20.0 | -- | -- | 1740 | 8.3 | 4.7 | 482 | 558 | 0 |
| 17... | 1000 | 2 | -- | 11.0 | -- | .03 | 1620 | 8.0 | 8.9 | 459 | 559 | 0 |
| 22... | 1240 | 2 | 1882 | 21.0 | -- | .06 | 1640 | 8.2 | 5.4 | 437 | 533 | 0 |
| 31... | 1345 | 2 | -- | 26.0 | -- | -- | 1630 | 8.2 | 5.6 | 451 | 550 | 0 |
| JUNE | | | | | | | | | | | | |
| 14... | 1230 | 2 | -- | 30.0 | .02 | -- | 1570 | 8.4 | 3.2 | 418 | 499 | 5 |
| 21... | 1330 | 2 | -- | 30.0 | -- | -- | 1530 | 8.5 | 2.4 | 381 | 438 | 13 |
| 25... | 1140 | 2 | -- | 25.0 | -- | .02 | 1540 | 8.2 | 4.6 | 374 | 455 | 0 |
| JULY | | | | | | | | | | | | |
| 02... | 0700 | 2 | -- | 10.0 | -- | .03 | 1630 | 8.1 | 6.9 | 445 | 543 | 0 |
| 12... | 1415 | 2 | -- | 27.0 | -- | .02 | 1580 | 8.3 | 3.7 | 376 | 459 | 0 |
| 27... | 1415 | 2 | -- | 26.0 | -- | .02 | 1610 | 8.1 | 6.6 | 426 | 519 | 0 |
| AUG. | | | | | | | | | | | | |
| 03... | 0840 | 2 | -- | 12.5 | -- | .02 | 1640 | 8.1 | 6.8 | 436 | 532 | 0 |
| 10... | 1005 | 2 | -- | 8.0 | -- | .02 | 1730 | 8.2 | 6.1 | 495 | 603 | 0 |
| SEP. | | | | | | | | | | | | |
| 12... | 1200 | 2 | -- | 8.0 | -- | .02 | 2010 | -- | -- | 545 | 664 | -- |
| 27... | 0945 | 2 | -- | 5.0 | -- | .04 | 1610 | -- | -- | 445 | 542 | -- |
| OCT. | | | | | | | | | | | | |
| 03... | 1210 | 2 | -- | 11.0 | -- | -- | 1730 | -- | -- | 460 | 561 | -- |
| 09... | 1120 | 2 | -- | 12.0 | -- | .03 | 1590 | -- | -- | 428 | 522 | -- |
| 16... | 1320 | 2 | -- | 14.0 | -- | .07 | 1570 | -- | -- | 413 | 504 | -- |
| 23... | 1030 | 2 | -- | 7.0 | -- | .06 | 1620 | -- | -- | 444 | 541 | -- |
| 30... | 1155 | 2 | -- | 5.0 | -- | .15 | 1580 | -- | -- | 393 | 479 | -- |
| NOV. | | | | | | | | | | | | |
| 05... | 1330 | 2 | -- | 13.5 | -- | .13 | 1460 | -- | -- | 400 | 488 | -- |

PROCESS DAT[illegible]3/03/75

09306025 - WEST FORK S[illegible]RT GULCH NEAR RIO BLANCO. CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | DIS-SOLVED NITRITE PLUS NITRATE (N) (MG/L) (00631) | DIS-SOLVED ORTHO PHOS-PHATE (PO4) (MG/L) (00660) | DIS-SOLVED ORTHO. PHOS-PHORUS (P) (MG/L) (00671) | HARD-NESS (CA.MG) (MG/L) (00900) | NON-CAR-BONATE HARD-NESS (MG/L) (00902) | DIS-SOLVED CAL-CIUM (CA) (MG/L) (00915) | DIS-SOLVED MAG-NE-SIUM (MG) (MG/L) (00925) | DIS-SOLVED SODIUM (NA) (MG/L) (00930) | SODIUM AD-SORP-TION RATIO (00931) | PERCENT SODIUM (00932) | DIS-SOLVED PO-TAS-SIUM (K) (MG/L) (00935) | DIS-SOLVED CHLO-RIDE (CL) (MG/L) (00940) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAY . 1974 | | | | | | | | | | | | |
| 03... | .16 | .03 | .01 | 690 | 200 | 110 | 100 | 160 | 2.7 | 33 | 7.0 | 10 |
| 17... | .08 | .05 | .02 | 660 | 200 | 100 | 100 | 160 | 2.7 | 34 | 2.8 | 8.8 |
| 22... | .02 | .06 | .02 | 650 | 210 | 95 | 100 | 160 | 2.7 | 35 | 2.7 | 8.6 |
| 31... | .04 | .12 | .04 | 650 | 200 | 96 | 99 | 150 | 2.6 | 33 | 2.6 | 10 |
| JUNE | | | | | | | | | | | | |
| 14... | .03 | .00 | .00 | 610 | 190 | 88 | 95 | 150 | 2.6 | 35 | 2.7 | 9.1 |
| 21... | .03 | .03 | .01 | 580 | 200 | 79 | 94 | 150 | 2.7 | 35 | 1.9 | 8.5 |
| 26... | .01 | .06 | .02 | 620 | 250 | 58 | 97 | 150 | 2.6 | 34 | 2.1 | 7.6 |
| JULY | | | | | | | | | | | | |
| 02... | .03 | .06 | .02 | 700 | 250 | 98 | 110 | 150 | 2.5 | 32 | 1.2 | 8.2 |
| 11... | .25 | .12 | .04 | 610 | 230 | 78 | 100 | 160 | 2.8 | 35 | 1.5 | 8.8 |
| 20... | .03 | .09 | .03 | 640 | 220 | 92 | 100 | 170 | 2.9 | 36 | 2.4 | 10 |
| AUG. | | | | | | | | | | | | |
| 03... | .02 | .06 | .02 | 650 | 220 | 96 | 100 | 150 | 2.6 | 33 | 1.5 | 8.6 |
| 10... | .37 | .09 | .03 | 700 | 200 | 97 | 110 | 160 | 2.6 | 33 | 3.8 | 12 |
| SEP. | | | | | | | | | | | | |
| 12... | .01 | .00 | .00 | 740 | 200 | 100 | 120 | 220 | 3.5 | 39 | 9.8 | 29 |
| 27... | .08 | .03 | .01 | 660 | 210 | 98 | 100 | 150 | 2.5 | 33 | 4.2 | 9.7 |
| OCT. | | | | | | | | | | | | |
| 03... | .02 | .03 | .01 | 590 | 130 | 77 | 96 | 180 | 3.2 | 40 | 6.4 | 19 |
| 09... | .02 | .03 | .01 | 580 | 150 | 77 | 94 | 150 | 2.7 | 36 | 1.9 | 11 |
| 16... | .02 | .00 | .00 | 610 | 190 | 94 | 90 | 150 | 2.7 | 35 | 4.1 | 10 |
| 23... | .01 | .00 | .00 | 620 | 180 | 100 | 91 | 160 | 2.8 | 36 | 4.6 | 11 |
| 30... | .08 | .03 | .01 | 530 | 140 | 48 | 100 | 160 | 3.0 | 39 | 4.9 | 12 |
| NOV. | | | | | | | | | | | | |
| 05... | .12 | .06 | .02 | 550 | 150 | 82 | 84 | 130 | 2.4 | 34 | 3.1 | 9.4 |

WATER QUALITY DATA

| DATE | DIS-SOLVED SULFATE (SO4) (MG/L) (00945) | DIS-SOLVED FLUO-RIDE (F) (MG/L) (00950) | DIS-SOLVED SILICA (SIO2) (MG/L) (00955) | DIS-SOLVED ARSENIC (AS) (UG/L) (01000) | DIS-SOLVED BARIUM (BA) (UG/L) (01005) | DIS-SOLVED BERYL-LIUM (BE) (UG/L) (01010) | DIS-SOLVED BISMUTH (BI) (UG/L) (01015) | DIS-SOLVED BORON (B) (UG/L) (01020) | DIS-SOLVED CAD-MIUM (CD) (UG/L) (01025) | DIS-SOLVED CHRO-MIUM (CR) (UG/L) (01030) | DIS-SOLVED COBALT (CO) (UG/L) (01035) | DIS-SOLVED COPPER (CU) (UG/L) (01040) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MAY , 1974 | | | | | | | | | | | | |
| 03... | 540 | .2 | 14 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 17... | 520 | .3 | 10 | 0 | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | 510 | .1 | 8.9 | 1 | 60 | <7 | <15 | 90 | 0 | <10 | <20 | <5 |
| 31... | 490 | 1.2 | 12 | 2 | 100 | -- | -- | 130 | 1 | -- | -- | 4 |
| JUNE | | | | | | | | | | | | |
| 14... | 470 | .2 | 15 | 3 | 200 | -- | -- | 130 | 1 | -- | -- | 6 |
| 21... | 460 | .0 | 15 | 2 | 0 | -- | -- | 130 | 1 | -- | -- | 2 |
| 25... | 470 | .2 | 15 | 1 | <100 | -- | -- | 100 | 2 | -- | -- | 3 |
| JULY | | | | | | | | | | | | |
| 02... | 470 | .1 | 16 | 3 | <100 | -- | -- | 90 | 0 | -- | -- | 4 |
| 11... | 540 | .2 | 16 | 3 | <100 | -- | -- | 120 | 2 | -- | -- | 2 |
| 20... | 510 | .2 | 17 | 0 | 0 | -- | -- | 160 | 1 | -- | -- | 5 |
| AUG. | | | | | | | | | | | | |
| 02... | 530 | .2 | 17 | 1 | 0 | -- | -- | 110 | 1 | -- | -- | 2 |
| 19... | 540 | .2 | 18 | 1 | 0 | -- | -- | 120 | 2 | -- | -- | 5 |
| SEP. | | | | | | | | | | | | |
| 12... | 580 | .1 | 17 | 2 | 0 | -- | -- | 150 | <1 | -- | -- | 8 |
| 27... | 450 | .2 | 17 | 1 | 0 | -- | -- | 80 | 2 | -- | -- | 1 |
| OCT. | | | | | | | | | | | | |
| 03... | 480 | .2 | 14 | 2 | 0 | -- | -- | 150 | 0 | -- | -- | 5 |
| 09... | 430 | .2 | 14 | 1 | 0 | -- | -- | 110 | <1 | -- | -- | 2 |
| 16... | 460 | .2 | 13 | 1 | <100 | -- | -- | 80 | 0 | -- | -- | 0 |
| 23... | 470 | .2 | 14 | 1 | 0 | -- | -- | 130 | 0 | -- | -- | 0 |
| 30... | 450 | .2 | 14 | 0 | <100 | -- | -- | 40 | 0 | -- | -- | 0 |
| NOV. | | | | | | | | | | | | |
| 06... | 380 | .2 | 13 | 1 | <100 | -- | -- | 90 | 1 | -- | -- | 1 |

PROCESS DATE [illegible]/03/75

09306025 - WEST FORK STE[illegible]T GULCH NEAR RIO BLANCO, CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | DIS-SOLVED IRON (FE) (UG/L) (01046) | DIS-SOLVED LEAD (PB) (UG/L) (01049) | DIS-SOLVED MAN-GANESE (MN) (UG/L) (01056) | DIS-SOLVED MOLYB-DENUM (MO) (UG/L) (01060) | DIS-SOLVED NICKEL (NI) (UG/L) (01065) | DIS-SOLVED SILVER (AG) (UG/L) (01075) | DIS-SOLVED STRON-TIUM (SR) (UG/L) (01080) | DIS-SOLVED VANA-DIUM (V) (UG/L) (01085) | DIS-SOLVED ZINC (ZN) (UG/L) (01090) | DIS-SOLVED TIN (SN) (UG/L) (01100) | DIS-SOLVED ALUM-INUM (AL) (UG/L) (01106) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MAY , 1974 | | | | | | | | | | | |
| 03... | 40 | -- | 0 | -- | -- | -- | -- | -- | -- | -- | -- |
| 17... | 20 | -- | 20 | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | 50 | <20 | 0 | <7 | <10 | <3 | 3200 | <10 | <10 | <15 | 40 |
| 31... | 50 | 6 | 10 | -- | -- | -- | -- | -- | 20 | -- | -- |
| JUNE | | | | | | | | | | | |
| 14... | 20 | 10 | 0 | -- | -- | -- | -- | -- | 20 | -- | -- |
| 21... | 30 | 2 | 0 | -- | -- | -- | -- | -- | 20 | -- | -- |
| 25... | 50 | 4 | 10 | -- | -- | -- | -- | -- | 10 | -- | -- |
| JULY | | | | | | | | | | | |
| 02... | 40 | 0 | 0 | -- | -- | -- | -- | -- | 30 | -- | -- |
| 11... | 20 | 7 | 10 | -- | -- | -- | -- | -- | 10 | -- | -- |
| 20... | 50 | 4 | 20 | -- | -- | -- | -- | -- | 10 | -- | -- |
| AUG. | | | | | | | | | | | |
| 03... | 190 | 6 | 0 | -- | -- | -- | -- | -- | 20 | -- | -- |
| 1[illegible]... | 80 | 2 | 10 | -- | -- | -- | -- | -- | 30 | -- | -- |
| SEP. | | | | | | | | | | | |
| 12... | 120 | 2 | 0 | -- | -- | -- | -- | -- | 10 | -- | -- |
| 27... | 60 | 2 | 0 | -- | -- | -- | -- | -- | 10 | -- | -- |
| OCT. | | | | | | | | | | | |
| 03... | 40 | 1 | 0 | -- | -- | -- | -- | -- | 20 | -- | -- |
| 09... | 50 | 3 | 0 | -- | -- | -- | -- | -- | 40 | -- | -- |
| 16... | 20 | 3 | 0 | -- | -- | -- | -- | -- | 20 | -- | -- |
| 23... | 20 | 9 | 10 | -- | -- | -- | -- | -- | 10 | -- | -- |
| 30... | 30 | 1 | 0 | -- | -- | -- | -- | -- | 20 | -- | -- |
| NOV. | | | | | | | | | | | |
| 06... | 210 | 3 | 0 | -- | -- | -- | -- | -- | 40 | -- | -- |

PROCESS DATE 3/75

09306025 - WEST FORK STEWA GULCH NEAR RIO BLANCO, CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | DIS-SOLVED GALLIUM (GA) (UG/L) (01120) | DIS-SOLVED GER-MANIUM (GE) (UG/L) (01125) | DIS-SOLVED LITHIUM (LI) (UG/L) (01130) | DIS-SOLVED SELE-NIUM (SE) (UG/L) (01145) | DIS-SOLVED TI-TANIUM (TI) (UG/L) (01150) | DIS-SOLVED ZIR-CONIUM (ZR) (UG/L) (01160) | DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L) (70301) | DIS-SOLVED SOLIDS (TONS PER DAY) (70302) | DIS-SOLVED SOLIDS (TONS PER AC-FT) (70303) | DIS-SOLVED MERCURY (HG) (UG/L) (71890) | ELEV. OF LAND SURFACE DATUM (FT. ABOVE MSL) (72000) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MAY . 1974 | | | | | | | | | | | |
| 03... | -- | -- | -- | -- | -- | -- | 1230 | -- | 1.67 | -- | 6668 |
| 17... | -- | -- | -- | 0 | -- | -- | 1180 | .10 | 1.60 | .0 | 6668 |
| 26... | <10 | <20 | 10 | 0 | <10 | <30 | 1150 | .19 | 1.56 | .0 | 6668 |
| 31... | -- | -- | 10 | 0 | -- | -- | 1130 | -- | 1.54 | .0 | 6668 |
| JUNE | | | | | | | | | | | |
| 14... | -- | -- | 10 | 1 | -- | -- | 1080 | .05 | 1.47 | .0 | 6668 |
| 21... | -- | -- | 20 | 1 | -- | -- | 1060 | -- | 1.44 | .0 | 6668 |
| 25... | -- | -- | 10 | 1 | -- | -- | 1060 | .05 | 1.44 | .9 | 6668 |
| JULY | | | | | | | | | | | |
| 02... | -- | -- | 0 | 0 | -- | -- | 1120 | .09 | 1.52 | .0 | 6668 |
| 11... | -- | -- | 0 | 0 | -- | -- | 1130 | .05 | 1.54 | .0 | 6668 |
| 20... | -- | -- | 10 | 1 | -- | -- | 1160 | .05 | 1.58 | .0 | 6668 |
| AUG. | | | | | | | | | | | |
| 03... | -- | -- | 0 | 0 | -- | -- | 1170 | .05 | 1.59 | .0 | 6668 |
| 10... | -- | -- | 0 | 1 | -- | -- | 1240 | .07 | 1.69 | .0 | 6668 |
| SEP. | | | | | | | | | | | |
| 12... | -- | -- | 0 | 1 | -- | -- | 1400 | .08 | 1.90 | .0 | 6668 |
| 27... | -- | -- | 0 | 0 | -- | -- | 1130 | .12 | 1.54 | .0 | 6668 |
| OCT. | | | | | | | | | | | |
| 03... | -- | -- | 0 | 0 | -- | -- | 1150 | -- | 1.55 | .0 | 6668 |
| 09... | -- | -- | 0 | 0 | -- | -- | 1040 | .08 | 1.41 | .0 | 6668 |
| 16... | -- | -- | 0 | 0 | -- | -- | 1090 | .21 | 1.48 | .0 | 6668 |
| 23... | -- | -- | 0 | 0 | -- | -- | 1120 | .18 | 1.52 | .0 | 6668 |
| 30... | -- | -- | 0 | 0 | -- | -- | 1030 | .42 | 1.40 | .0 | 6668 |
| NOV. | | | | | | | | | | | |
| 06... | -- | -- | 0 | 5 | -- | -- | 943 | .33 | 1.28 | .0 | 6668 |

PROCESS DATE 02/03/75
DISTRICT CODE 08

09306058 - WILLOW CREEK NEAR RIO BLANCO, CO.

WATER QUALITY DATA

| DATE | TIME | TYPE | SAMPLE NUMBER (00005) | TEMPER-ATURE (DEG C) (00010) | DIS-CHARGE (CFS) (00060) | INSTAN-TANEOUS DIS-CHARGE (CFS) (00061) | TUR-BID-ITY (JTU) (00070) | COLOR (PLAT-INUM-COBALT UNITS) (00080) | SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS) (00095) | PH (UNITS) (00400) | CARBON DIOXIDE (CO2) (MG/L) (00405) | ALKA-LINITY AS CACO3 (MG/L) (00410) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 23... | 1715 | 2 | -- | 12.0 | -- | 1.0 | -- | -- | 1590 | 8.2 | 5.8 | 458 |
| MAY | | | | | | | | | | | | |
| [illegible]3... | 1545 | 2 | -- | 17.0 | -- | 1.6 | -- | -- | 1560 | 8.2 | 5.6 | 457 |
| 1[illegible]... | 1245 | 2 | -- | 10.0 | -- | 1.1 | -- | -- | 1390 | 7.9 | 10 | 425 |
| 22... | 1410 | 2 | 1683 | 17.0 | -- | 1.0 | -- | -- | 1400 | 7.9 | 10 | 414 |
| 31... | 1445 | 2 | -- | 16.0 | -- | 1.1 | -- | -- | 1350 | 8.0 | 8.0 | 412 |
| JUNE | | | | | | | | | | | | |
| 14... | 1500 | 2 | -- | 18.0 | .67 | -- | -- | -- | 1390 | 8.0 | 8.3 | 426 |
| 25... | 1630 | 2 | -- | 18.5 | .99 | .99 | -- | -- | 1410 | 8.0 | 7.7 | 395 |
| JULY | | | | | | | | | | | | |
| [illegible]2... | 1145 | 2 | -- | 14.0 | -- | .79 | -- | -- | 1390 | 8.0 | 8.1 | 415 |
| 1[illegible]... | 12[illegible] | 2 | -- | 16.5 | -- | 1.5 | -- | -- | 1410 | 7.9 | 10 | 422 |
| 2[illegible]... | 1315 | 2 | -- | 17.5 | -- | .94 | -- | -- | 1330 | 7.8 | 13 | 408 |
| AUG. | | | | | | | | | | | | |
| 13... | 1045 | 2 | -- | 10.5 | -- | 1.8 | -- | -- | 1400 | 7.9 | 11 | 434 |
| 1[illegible]... | 1415 | 2 | -- | 13.0 | -- | 1.8 | -- | -- | 1390 | 7.9 | 11 | 429 |
| SEP. | | | | | | | | | | | | |
| 12... | 1530 | 2 | -- | 13.0 | -- | 1.1 | -- | -- | 1390 | -- | -- | 436 |
| 27... | 1245 | 2 | -- | 11.0 | -- | .57 | -- | -- | 1400 | -- | -- | 421 |
| OCT. | | | | | | | | | | | | |
| 4... | 1420 | 2 | -- | 11.5 | -- | -- | -- | -- | 1370 | -- | -- | 409 |
| [illegible]... | 1400 | 2 | -- | 14.0 | -- | .56 | -- | -- | 1390 | -- | -- | 419 |
| 17... | 1100 | 2 | -- | 8.0 | -- | .58 | -- | -- | 1380 | -- | -- | 417 |
| 23... | 1400 | 2 | -- | 11.0 | -- | .77 | -- | -- | 1400 | -- | -- | 419 |
| 31... | 1100 | 2 | -- | 6.5 | -- | -- | -- | -- | 1440 | -- | -- | 450 |
| NOV. | | | | | | | | | | | | |
| 5... | 1430 | 2 | -- | 9.0 | -- | .93 | -- | -- | 1450 | -- | -- | 449 |
| 20... | 1245 | 2 | -- | 8.5 | -- | 1.4 | -- | -- | 1470 | -- | -- | 476 |
| DEC. | | | | | | | | | | | | |
| 17... | 1200 | 2 | -- | 3.7 | -- | 2.8 | 30 | 3 | 1500 | 8.7 | 1.7 | 438 |

PROCESS DATE 02/03/75
DISTRICT CODE 08

09306058 - WILLOW CREEK NEAR RIO BLANCO, CO.

WATER QUALITY DATA

| DATE | BICAR-BONATE (HCO3) (MG/L) (00440) | CAR-BONATE (CO3) (MG/L) (00445) | OIL AND GREASE (MG/L) (00550) | DIS-SOLVED AMMONIA NITRO-GEN (N) (MG/L) (00608) | DIS-SOLVED NITRITE (N) (MG/L) (00613) | DIS-SOLVED NITRATE (N) (MG/L) (00618) | TOTAL KJEL-DAHL NITRO-GEN (N) (MG/L) (00625) | DIS-SOLVED NITRITE PLUS NITRATE (N) (MG/L) (00631) | DIS-SOLVED ORTHO PHOS-PHATE (PO4) (MG/L) (00660) | TOTAL PHOS-PHORUS (P) (MG/L) (00665) | DIS-SOLVED ORTHO. PHOS-PHORUS (P) (MG/L) (00671) | CYANIDE (CN) (MG/L) (00720) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 23... | 570 | 0 | -- | -- | -- | -- | -- | .52 | .12 | -- | .04 | -- |
| MAY | | | | | | | | | | | | |
| 03... | 557 | 0 | -- | -- | -- | -- | -- | 2.0 | .09 | -- | .03 | -- |
| 17... | 519 | 0 | -- | -- | -- | -- | -- | .63 | .09 | -- | .03 | -- |
| 22... | 505 | 0 | -- | -- | -- | -- | -- | .46 | .09 | -- | .03 | -- |
| 30... | 502 | 0 | -- | -- | -- | -- | -- | .19 | .12 | -- | .04 | -- |
| JUNE | | | | | | | | | | | | |
| 14... | 517 | 0 | -- | -- | -- | -- | -- | .34 | .06 | -- | .02 | -- |
| 24... | 482 | 0 | -- | -- | -- | -- | -- | .29 | .03 | -- | .01 | -- |
| JULY | | | | | | | | | | | | |
| 02... | 504 | 0 | -- | -- | -- | -- | -- | .23 | .00 | -- | .00 | -- |
| 11... | 515 | 0 | -- | -- | -- | -- | -- | .46 | .12 | -- | .04 | -- |
| 2[illegible]... | 493 | 0 | -- | -- | -- | -- | -- | .35 | .03 | -- | .01 | -- |
| AUG. | | | | | | | | | | | | |
| 13... | 529 | 0 | -- | -- | -- | -- | -- | .27 | .03 | -- | .01 | -- |
| 1[illegible]... | 523 | 0 | -- | -- | -- | -- | -- | .28 | .00 | -- | .00 | -- |
| SEP. | | | | | | | | | | | | |
| 12... | 513 | 0 | -- | -- | -- | -- | -- | .39 | .03 | -- | .01 | -- |
| 2[illegible]... | 513 | -- | -- | -- | -- | -- | -- | .43 | .03 | -- | .01 | -- |
| OCT. | | | | | | | | | | | | |
| 04... | 499 | -- | -- | -- | -- | -- | -- | .42 | .09 | -- | .03 | -- |
| [illegible]... | 511 | -- | -- | -- | -- | -- | -- | .04 | .09 | -- | .03 | -- |
| 17... | 509 | -- | -- | -- | -- | -- | -- | .54 | .03 | -- | .01 | -- |
| 23... | 511 | -- | -- | -- | -- | -- | -- | .48 | .03 | -- | .01 | -- |
| 31... | 549 | -- | -- | -- | -- | -- | -- | .48 | .03 | -- | .01 | -- |
| NOV. | | | | | | | | | | | | |
| 06... | 548 | -- | -- | -- | -- | -- | -- | .29 | .03 | -- | .01 | -- |
| 21... | 540 | -- | -- | -- | -- | -- | -- | .80 | .03 | -- | .01 | -- |
| DEC. | | | | | | | | | | | | |
| 17... | 534 | 0 | 1 | .05 | .00 | .41 | .20 | .41 | .03 | .09 | .01 | .01 |

PROCESS DATE [illegible]03/75
DISTRICT CODE 08

09306058 - WILLOW CREEK NEAR RIO BLANCO, CO.

WATER QUALITY DATA

| DATE | DIS-SOLVED SULFIDE (S) (MG/L) (00746) | HARDNESS (CA,MG) (MG/L) (00900) | NON-CARBONATE HARDNESS (MG/L) (00902) | DIS-SOLVED CALCIUM (CA) (MG/L) (00915) | DIS-SOLVED MAGNESIUM (MG) (MG/L) (00925) | DIS-SOLVED SODIUM (NA) (MG/L) (00930) | SODIUM AD-SORPTION RATIO (00931) | PERCENT SODIUM (00932) | DIS-SOLVED POTASSIUM (K) (MG/L) (00935) | DIS-SOLVED CHLORIDE (CL) (MG/L) (00940) | DIS-SOLVED SULFATE (SO4) (MG/L) (00945) | DIS-SOLVED FLUORIDE (F) (MG/L) (00950) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 23... | -- | 590 | 120 | 100 | 83 | 150 | 2.7 | 35 | 5.0 | 14 | 450 | .5 |
| MAY | | | | | | | | | | | | |
| 03... | -- | 610 | 150 | 100 | 87 | 140 | 2.5 | 33 | 4.2 | 12 | 440 | .5 |
| 17... | -- | 570 | 150 | 98 | 80 | 130 | 2.4 | 33 | 2.0 | 9.9 | 380 | .3 |
| 22... | -- | 570 | 150 | 95 | 80 | 130 | 2.4 | 33 | 1.8 | 10 | 380 | .3 |
| 31... | -- | 560 | 140 | 94 | 76 | 130 | 2.4 | 34 | 1.7 | 13 | 370 | 1.3 |
| JUNE | | | | | | | | | | | | |
| 04... | -- | 570 | 140 | 96 | 80 | 130 | 2.4 | 33 | 2.3 | 10 | 340 | .4 |
| 25... | -- | 560 | 160 | 92 | 80 | 140 | 2.6 | 35 | 3.8 | 9.8 | 360 | .4 |
| JULY | | | | | | | | | | | | |
| 02... | -- | 540 | 130 | 94 | 75 | 130 | 2.4 | 34 | 1.7 | 11 | 350 | .3 |
| 11... | -- | 570 | 140 | 95 | 80 | 130 | 2.4 | 33 | 2.2 | 12 | 380 | .3 |
| 25... | -- | 540 | 130 | 91 | 75 | 130 | 2.4 | 34 | 2.2 | 12 | 360 | .3 |
| AUG. | | | | | | | | | | | | |
| [illegible] | -- | 560 | 130 | 90 | 76 | 130 | 2.4 | 33 | 2.0 | 11 | 360 | .3 |
| [illegible] | -- | 550 | 140 | 99 | 77 | 180 | 3.3 | 41 | 2.2 | 11 | 500 | .3 |
| SEPT. | | | | | | | | | | | | |
| 12... | -- | 550 | 120 | 98 | 75 | 130 | 2.4 | 34 | 1.6 | 12 | 320 | .4 |
| 27... | -- | 550 | 130 | 96 | 75 | 130 | 2.4 | 34 | 2.6 | 10 | 350 | .4 |
| OCT. | | | | | | | | | | | | |
| 4... | -- | 460 | 51 | 64 | 73 | 130 | 2.6 | 38 | 2.3 | 10 | 330 | .4 |
| [illegible] | -- | 490 | 74 | 72 | 76 | 140 | 2.7 | 38 | 1.1 | 11 | 350 | .4 |
| 17... | -- | 540 | 130 | 99 | 72 | 120 | 2.2 | 32 | 2.3 | 9.9 | 340 | .4 |
| 23... | -- | 490 | 69 | 80 | 70 | 130 | 2.6 | 37 | 2.5 | 10 | 330 | .5 |
| 31... | -- | 560 | 110 | 100 | 76 | 130 | 2.4 | 33 | 2.9 | 11 | 340 | .4 |
| NOV. | | | | | | | | | | | | |
| 04... | -- | 570 | 120 | 100 | 77 | 130 | 2.4 | 33 | 2.3 | 10 | 350 | .2 |
| 21... | -- | 540 | 98 | 99 | 72 | 140 | 2.5 | 36 | 2.6 | 11 | 350 | .4 |
| DEC. | | | | | | | | | | | | |
| 17... | .5 | 580 | 140 | 100 | 79 | 120 | 2.2 | 31 | 1.5 | 11 | 330 | .4 |

PROCESS DATE 02/03/75
DISTRICT CODE 09

## 09306058 - WILLOW CREEK NEAR RIO BLANCO, CO.

## WATER QUALITY DATA

| DATE | DIS-SOLVED SILICA (SIO2) (MG/L) (00955) | DIS-SOLVED ARSENIC (AS) (UG/L) (01000) | DIS-SOLVED BARIUM (BA) (UG/L) (01005) | DIS-SOLVED BERYL-LIUM (BE) (UG/L) (01010) | DIS-SOLVED BISMUTH (BI) (UG/L) (01015) | DIS-SOLVED BORON (B) (UG/L) (01020) | DIS-SOLVED CAD-MIUM (CD) (UG/L) (01025) | DIS-SOLVED CHRO-MIUM (CR) (UG/L) (01030) | DIS-SOLVED COBALT (CO) (UG/L) (01035) | DIS-SOLVED COPPER (CU) (UG/L) (01040) | DIS-SOLVED IRON (FE) (UG/L) (01045) | DIS-SOLVED LEAD (PB) (UG/L) (01049) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 25... | 16 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 150 | -- |
| MAY | | | | | | | | | | | | |
| 13... | 17 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 40 | -- |
| 17... | 17 | 1 | -- | -- | -- | -- | -- | -- | -- | -- | 20 | -- |
| 22... | 16 | 1 | 55 | <5 | <13 | 120 | 0 | <9 | <20 | <4 | 20 | <20 |
| 31... | 16 | 2 | 0 | -- | -- | 130 | 1 | -- | -- | 2 | 30 | 3 |
| JUNE | | | | | | | | | | | | |
| [illegible] | 17 | 1 | 200 | -- | -- | 140 | 0 | -- | -- | 2 | 90 | 8 |
| [illegible] | 16 | 1 | <100 | -- | -- | 120 | 6 | -- | -- | 17 | 40 | 4 |
| JULY | | | | | | | | | | | | |
| 2... | 15 | 3 | <100 | -- | -- | 120 | 0 | -- | -- | 1 | 20 | 3 |
| [illegible] | 17 | 2 | <100 | -- | -- | 130 | 2 | -- | -- | 9 | 20 | 5 |
| [illegible] | 16 | 0 | 0 | -- | -- | 60 | 1 | -- | -- | 8 | 50 | 3 |
| AUG. | | | | | | | | | | | | |
| [illegible] | 15 | 1 | 0 | -- | -- | 130 | 1 | -- | -- | 6 | 40 | 2 |
| [illegible] | 14 | 1 | 0 | -- | -- | 130 | 1 | -- | -- | 5 | 20 | 3 |
| SEP. | | | | | | | | | | | | |
| 12... | 18 | 1 | 0 | -- | -- | 120 | <1 | -- | -- | 3 | 40 | 2 |
| 27... | 18 | 1 | 0 | -- | -- | 110 | <1 | -- | -- | 1 | 50 | 2 |
| OCT. | | | | | | | | | | | | |
| [illegible] | 17 | 1 | 0 | -- | -- | 70 | 0 | -- | -- | 2 | 20 | 1 |
| [illegible] | 16 | 2 | 0 | -- | -- | 140 | <1 | -- | -- | 2 | 40 | 7 |
| [illegible] | 17 | 1 | <100 | -- | -- | 90 | 0 | -- | -- | 0 | 20 | 3 |
| 23... | 18 | 1 | 0 | -- | -- | 160 | 0 | -- | -- | 0 | 40 | 3 |
| 31... | 15 | 1 | <100 | -- | -- | 80 | 0 | -- | -- | 0 | 20 | 1 |
| NOV. | | | | | | | | | | | | |
| [illegible] | 8.2 | 0 | <100 | -- | -- | 150 | 1 | -- | -- | 2 | 320 | 5 |
| [illegible] | 17 | 2 | <100 | -- | -- | 70 | 0 | -- | -- | 1 | 30 | 1 |
| DEC. | | | | | | | | | | | | |
| 17... | 16 | 1 | <100 | -- | -- | 120 | 1 | <10 | -- | 0 | 10 | 1 |

09306058 - WILLOW CREEK NEAR RIO BLANCO, CO.

WATER QUALITY DATA

| DATE | DIS-SOLVED MANGANESE (MN) (UG/L) (01056) | DIS-SOLVED MOLYB-DENUM (MO) (UG/L) (01060) | DIS-SOLVED NICKEL (NI) (UG/L) (01065) | DIS-SOLVED SILVER (AG) (UG/L) (01075) | DIS-SOLVED STRON-TIUM (SR) (UG/L) (01080) | DIS-SOLVED VANA-DIUM (V) (UG/L) (01085) | DIS-SOLVED ZINC (ZN) (UG/L) (01090) | DIS-SOLVED TIN (SN) (UG/L) (01100) | DIS-SOLVED ALUM-INUM (AL) (UG/L) (01106) | DIS-SOLVED GALLIUM (GA) (UG/L) (01120) | DIS-SOLVED GER-MANIUM (GE) (UG/L) (01125) | DIS-SOLVED LITHIUM (LI) (UG/L) (01130) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 23... | 30 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MAY | | | | | | | | | | | | |
| 03... | 20 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 17... | 40 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | 20 | <6 | <9 | <2 | 3000 | <9.0 | 8 | <13 | 50 | <9 | <20 | 8 |
| 31... | 10 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- | 10 |
| JUNE | | | | | | | | | | | | |
| 14... | 0 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- | 10 |
| 26... | 20 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- | 10 |
| JULY | | | | | | | | | | | | |
| 2... | 0 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- | 0 |
| 11... | 20 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- | 0 |
| 29... | 50 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- | 0 |
| AUG. | | | | | | | | | | | | |
| 13... | 20 | -- | -- | -- | -- | -- | 40 | -- | -- | -- | -- | 0 |
| 19... | 20 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- | 0 |
| SEP. | | | | | | | | | | | | |
| 12... | 0 | -- | -- | -- | -- | -- | 0 | -- | -- | -- | -- | 0 |
| 27... | 0 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- | 0 |
| OCT. | | | | | | | | | | | | |
| 04... | 0 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- | 0 |
| 09... | 0 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- | 0 |
| 17... | 0 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- | 0 |
| 23... | 10 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- | 0 |
| 31... | 0 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- | 0 |
| NOV. | | | | | | | | | | | | |
| 5... | 10 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- | 0 |
| 21... | 20 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- | 0 |
| DEC. | | | | | | | | | | | | |
| 17... | 0 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- | 10 |

09306058 - WILLOW CREEK NEAR RIO BLANCO, CO.

WATER QUALITY DATA

| DATE | DIS-SOLVED SELE-NIUM (SE) (UG/L) (01145) | DIS-SOLVED TI-TANIUM (TI) (UG/L) (01150) | DIS-SOLVED ZIR-CONIUM (ZR) (UG/L) (01160) | DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L) (70301) | DIS-SOLVED SOLIDS (TONS PER DAY) (70302) | DIS-SOLVED SOLIDS (TONS PER AC-FT) (70303) | TOTAL ORTHO PHOS-PHORUS (P) (MG/L) (70507) | DIS_SOLVED AMMONIA (NH4) (MG/L) (71846) | DIS_SOLVED NITRATE (NO3) (MG/L) (71851) | DIS_SOLVED NITRITE (NO2) (MG/L) (71856) | DIS-SOLVED MERCURY (HG) (UG/L) (71890) | ELEV. OF LAND SURFACE DATUM (FT. ABOVE MSL) (72000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 23... | -- | -- | -- | 1100 | 3.24 | 1.50 | -- | -- | -- | -- | -- | 6273 |
| MAY | | | | | | | | | | | | |
| 03... | -- | -- | -- | 1080 | 4.57 | 1.47 | -- | -- | -- | -- | -- | 6273 |
| 17... | 1 | -- | -- | 976 | 2.90 | 1.33 | -- | -- | -- | -- | .0 | 6273 |
| 2[illegible]... | 1 | <[illegible] | <30 | 944 | 2.31 | 1.31 | -- | -- | -- | -- | .0 | 6273 |
| 31... | 1 | -- | -- | 953 | 2.91 | 1.30 | -- | -- | -- | -- | .0 | 6273 |
| JUNE | | | | | | | | | | | | |
| 14... | 1 | -- | -- | 933 | 1.69 | 1.27 | -- | -- | -- | -- | .0 | 6273 |
| 26... | 1 | -- | -- | 941 | 2.52 | 1.28 | -- | -- | -- | -- | .1 | 6273 |
| JULY | | | | | | | | | | | | |
| 02... | 1 | -- | -- | 938 | 2.00 | 1.28 | -- | -- | -- | -- | .0 | 6273 |
| 11... | 2 | -- | -- | 973 | 3.49 | 1.32 | -- | -- | -- | -- | .0 | 6273 |
| 2[illegible]... | 1 | -- | -- | 934 | 2.37 | 1.27 | -- | -- | -- | -- | .0 | 6273 |
| AUG. | | | | | | | | | | | | |
| 03... | 2 | -- | -- | 956 | 4.65 | 1.30 | -- | -- | -- | -- | .0 | 6273 |
| 1[illegible]... | 0 | -- | -- | 1150 | 5.65 | 1.56 | -- | -- | -- | -- | .0 | 6273 |
| SEP. | | | | | | | | | | | | |
| 16... | 1 | -- | -- | 919 | 2.33 | 1.25 | -- | -- | -- | -- | .2 | 6273 |
| 27... | 2 | -- | -- | 947 | 1.46 | 1.29 | -- | -- | -- | -- | .0 | 6273 |
| OCT. | | | | | | | | | | | | |
| 04... | 1 | -- | -- | 875 | -- | 1.19 | -- | -- | -- | -- | .0 | 6273 |
| 0[illegible]... | 1 | -- | -- | 925 | 1.40 | 1.26 | -- | -- | -- | -- | .0 | 6273 |
| 17... | 1 | -- | -- | 914 | 1.43 | 1.24 | -- | -- | -- | -- | .0 | 6273 |
| 23... | 1 | -- | -- | 895 | 1.66 | 1.22 | -- | -- | -- | -- | .0 | 6273 |
| 31... | 0 | -- | -- | 949 | -- | 1.29 | -- | -- | -- | -- | .0 | 6273 |
| NOV. | | | | | | | | | | | | |
| [illegible]... | 1 | -- | -- | 959 | 2.39 | 1.29 | -- | -- | -- | -- | .0 | 6273 |
| 2[illegible]... | 1 | -- | -- | 982 | 3.42 | 1.34 | -- | -- | -- | -- | .0 | 6273 |
| DEC. | | | | | | | | | | | | |
| 17... | 1 | -- | -- | 924 | 7.19 | 1.26 | .03 | .06 | 1.8 | .00 | <.1 | 6273 |

PROCESS DATE [illegible]03/75
09306058 - WILLOW CREEK [illegible] RIO BLANCO, CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | TIME | TYPE | SAMPLE NUMBER (00008) | TEMPER-ATURE (DEG C) (00010) | DIS-CHARGE (CFS) (00060) | INSTAN-TANEOUS DIS-CHARGE (CFS) (00061) | TUR-BID-ITY (JTU) (00070) | COLOR (PLAT-INUM-COBALT UNITS) (00080) | SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS) (00095) | CHEM-ICAL OXYGEN DEMAND (HIGH LEVEL) (MG/L) (00340) | PH (UNITS) (00400) | CARBON DIOXIDE (CO2) (MG/L) (00405) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 23... | 1715 | 2 | -- | 12.0 | -- | 1.0 | -- | -- | 1590 | -- | 8.2 | 5.8 |
| MAY | | | | | | | | | | | | |
| 03... | 1545 | 2 | -- | 17.0 | -- | 1.6 | -- | -- | 1560 | -- | 8.2 | 5.6 |
| 17... | 1245 | 2 | -- | 10.0 | -- | 1.1 | -- | -- | 1390 | -- | 7.9 | 10 |
| 28... | 1410 | 2 | 1683 | 17.0 | -- | 1.0 | -- | -- | 1400 | -- | 7.9 | 10 |
| 31... | 1445 | 2 | -- | 18.0 | -- | 1.1 | -- | -- | 1350 | -- | 8.0 | 8.0 |
| JUNE | | | | | | | | | | | | |
| 14... | 1500 | 2 | -- | 18.0 | .67 | -- | -- | -- | 1380 | -- | 8.0 | 8.3 |
| 26... | 1500 | 2 | -- | 18.5 | .99 | .99 | -- | -- | 1410 | -- | 8.0 | 7.7 |
| JULY | | | | | | | | | | | | |
| 02... | 1045 | 2 | -- | 14.0 | -- | .79 | -- | -- | 1390 | -- | 8.0 | 8.1 |
| 11... | 1200 | 2 | -- | 16.5 | -- | 1.3 | -- | -- | 1410 | -- | 7.9 | 10 |
| 20... | 1315 | 2 | -- | 17.5 | -- | .94 | -- | -- | 1330 | -- | 7.8 | 13 |
| AUG. | | | | | | | | | | | | |
| 03... | 1045 | 2 | -- | 10.5 | -- | 1.8 | -- | -- | 1400 | -- | 7.9 | 11 |
| 10... | 1415 | 2 | -- | 13.0 | -- | 1.8 | -- | -- | 1390 | -- | 7.9 | 11 |
| SEP. | | | | | | | | | | | | |
| 12... | 1530 | 2 | -- | 13.0 | -- | 1.1 | -- | -- | 1390 | -- | -- | -- |
| 27... | 1245 | 2 | -- | 11.0 | -- | .57 | -- | -- | 1400 | -- | -- | -- |
| OCT. | | | | | | | | | | | | |
| 04... | 1420 | 2 | -- | 11.5 | -- | -- | -- | -- | 1370 | -- | -- | -- |
| 09... | 1500 | 2 | -- | 14.0 | -- | .56 | -- | -- | 1390 | -- | -- | -- |
| 17... | 1100 | 2 | -- | 8.0 | -- | .58 | -- | -- | 1380 | -- | -- | -- |
| 23... | 1400 | 2 | -- | 11.0 | -- | .77 | -- | -- | 1400 | -- | -- | -- |
| 31... | 1100 | 2 | -- | 6.5 | -- | -- | -- | -- | 1440 | -- | -- | -- |
| NOV. | | | | | | | | | | | | |
| 05... | 1430 | 2 | -- | 9.0 | -- | .93 | -- | -- | 1460 | -- | -- | -- |
| 20... | 1245 | 2 | -- | 8.5 | -- | 1.4 | -- | -- | 1470 | -- | -- | -- |
| DEC. | | | | | | | | | | | | |
| 04... | 1045 | 2 | 751700 | 4.0 | -- | 3.3 | 70 | 5 | 3500 | 35 | 8.2 | 5.4 |
| 17... | 1200 | 2 | -- | 3.7 | -- | 2.8 | 30 | 3 | 1500 | -- | 8.7 | 1.7 |
| JAN., 1975 | | | | | | | | | | | | |
| 03... | 1000 | 2 | -- | .0 | -- | 2.4 | 9 | 3 | 1200 | -- | 8.0 | 8.4 |
| 15... | -- | 2 | -- | 3.5 | -- | 2.5 | 40 | 5 | 1350 | -- | 8.1 | 6.5 |
| FEB. | | | | | | | | | | | | |
| 03... | 1300 | 2 | -- | 3.5 | -- | -- | 30 | 0 | 1500 | -- | 7.5 | 27 |

## 09306058 - WILLOW CREEK R RIO BLANCO, CO.

### WATER QUALITY DATA

| DATE | ALKA-LINITY AS CACO3 (MG/L) (00410) | BICAR-BONATE (HCO3) (MG/L) (00440) | CAR-BONATE (CO3) (MG/L) (00445) | OIL AND GREASE (MG/L) (00550) | DIS-SOLVED AMMONIA NITRO-GEN (N) (MG/L) (00608) | DIS-SOLVED NITRITE (N) (MG/L) (00613) | DIS-SOLVED NITRATE (N) (MG/L) (00618) | TOTAL KJEL-DAHL NITRO-GEN (N) (MG/L) (00625) | DIS-SOLVED NITRITE PLUS NITRATE (N) (MG/L) (00631) | DIS-SOLVED ORTHO PHOS-PHATE (PO4) (MG/L) (00660) | TOTAL PHOS-PHORUS (P) (MG/L) (00665) | DIS-SOLVED ORTHO. PHOS-PHORUS (P) (MG/L) (00671) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 23... | 468 | 570 | 0 | -- | -- | -- | -- | -- | .52 | .12 | -- | .04 |
| MAY | | | | | | | | | | | | |
| 03... | 457 | 557 | 0 | -- | -- | -- | -- | -- | 2.0 | .09 | -- | .03 |
| 17... | 425 | 518 | 0 | -- | -- | -- | -- | -- | .53 | .09 | -- | .03 |
| 22... | 414 | 505 | 0 | -- | -- | -- | -- | -- | .46 | .09 | -- | .03 |
| 31... | 412 | 502 | 0 | -- | -- | -- | -- | -- | .19 | .12 | -- | .04 |
| JUNE | | | | | | | | | | | | |
| 14... | 425 | 519 | 0 | -- | -- | -- | -- | -- | .34 | .05 | -- | .02 |
| 25... | 395 | 482 | 0 | -- | -- | -- | -- | -- | .29 | .03 | -- | .01 |
| JULY | | | | | | | | | | | | |
| 02... | 415 | 506 | 0 | -- | -- | -- | -- | -- | .23 | .00 | -- | .00 |
| 11... | 422 | 515 | 0 | -- | -- | -- | -- | -- | .46 | .12 | -- | .04 |
| 20... | 408 | 498 | 0 | -- | -- | -- | -- | -- | .35 | .03 | -- | .01 |
| AUG. | | | | | | | | | | | | |
| 03... | 434 | 529 | 0 | -- | -- | -- | -- | -- | .27 | .03 | -- | .01 |
| 10... | 429 | 523 | 0 | -- | -- | -- | -- | -- | .28 | .00 | -- | .00 |
| SEP. | | | | | | | | | | | | |
| 12... | 436 | 513 | 9 | -- | -- | -- | -- | -- | .39 | .03 | -- | .01 |
| 27... | 421 | 513 | -- | -- | -- | -- | -- | -- | .43 | .03 | -- | .01 |
| OCT. | | | | | | | | | | | | |
| 04... | 409 | 499 | -- | -- | -- | -- | -- | -- | .42 | .09 | -- | .03 |
| 09... | 419 | 511 | -- | -- | -- | -- | -- | -- | .94 | .09 | -- | .03 |
| 17... | 417 | 509 | -- | -- | -- | -- | -- | -- | .54 | .03 | -- | .01 |
| 23... | 419 | 511 | -- | -- | -- | -- | -- | -- | .48 | .03 | -- | .01 |
| 31... | 450 | 549 | -- | -- | -- | -- | -- | -- | .48 | .03 | -- | .01 |
| NOV. | | | | | | | | | | | | |
| 06... | 449 | 548 | -- | -- | -- | -- | -- | -- | .29 | .03 | -- | .01 |
| 20... | 476 | 580 | -- | -- | -- | -- | -- | -- | .80 | .03 | -- | .01 |
| DEC. | | | | | | | | | | | | |
| 05... | 437 | 533 | 0 | 4 | .07 | .00 | .40 | .39 | .40 | .09 | .65 | .03 |
| 17... | 439 | 534 | 0 | 1 | .05 | .00 | .41 | .20 | .41 | .03 | .09 | .01 |
| JAN., 1975 | | | | | | | | | | | | |
| 03... | 428 | 522 | 0 | 7 | .03 | .00 | .40 | .25 | .40 | .03 | .04 | .01 |
| 15... | 419 | 511 | 0 | 6 | .02 | .01 | .60 | .48 | .61 | .06 | .08 | .02 |
| FEB. | | | | | | | | | | | | |
| 03... | 436 | 531 | 0 | 5 | .08 | .00 | .43 | 1.0 | .43 | .15 | .05 | .05 |

09306059 - WILLOW CREEK NEAR RIO BLANCO, CO.

WATER QUALITY DATA

| DATE | CYANIDE (CN) (MG/L) (00720) | DIS-SOL-VED SUL-FIDE (S) (MG/L) (00746) | HARD-NESS (CA,MG) (MG/L) (00900) | NON-CAR-BONATE HARD-NESS (MG/L) (00902) | DIS-SOLVED CAL-CIUM (CA) (MG/L) (00915) | DIS-SOLVED MAG-NE-SIUM (MG) (MG/L) (00925) | DIS-SOLVED SODIUM (NA) (MG/L) (00930) | SODIUM AD-SORP-TION RATIO (00931) | PERCENT SODIUM (00932) | DIS-SOLVED PO-TAS-SIUM (K) (MG/L) (00935) | DIS-SOLVED CHLO-RIDE (CL) (MG/L) (00940) | DIS-SOLVED SULFATE (SO4) (MG/L) (00945) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 23... | -- | -- | 590 | 120 | 100 | 83 | 150 | 2.7 | 35 | 5.0 | 14 | 450 |
| MAY | | | | | | | | | | | | |
| 03... | -- | -- | 610 | 150 | 100 | 87 | 140 | 2.5 | 33 | 4.2 | 12 | 440 |
| 17... | -- | -- | 570 | 150 | 98 | 80 | 130 | 2.4 | 33 | 2.0 | 9.9 | 380 |
| 22... | -- | -- | 570 | 150 | 95 | 80 | 130 | 2.4 | 33 | 1.8 | 10 | 380 |
| 31... | -- | -- | 560 | 140 | 94 | 78 | 130 | 2.4 | 34 | 1.7 | 13 | 370 |
| JUNE | | | | | | | | | | | | |
| 14... | -- | -- | 570 | 140 | 96 | 80 | 130 | 2.4 | 33 | 2.3 | 10 | 340 |
| 26... | -- | -- | 560 | 160 | 92 | 80 | 140 | 2.6 | 35 | 3.8 | 9.6 | 350 |
| JULY | | | | | | | | | | | | |
| 02... | -- | -- | 540 | 130 | 94 | 75 | 130 | 2.4 | 34 | 1.7 | 11 | 350 |
| 11... | -- | -- | 570 | 140 | 95 | 80 | 130 | 2.4 | 33 | 2.2 | 12 | 350 |
| 2[illegible]... | -- | -- | 540 | 130 | 91 | 75 | 130 | 2.4 | 34 | 2.2 | 12 | 360 |
| AUG. | | | | | | | | | | | | |
| 03... | -- | -- | 560 | 130 | 99 | 76 | 130 | 2.4 | 33 | 2.0 | 11 | 350 |
| 19... | -- | -- | 560 | 140 | 99 | 77 | 180 | 3.3 | 41 | 2.2 | 11 | 500 |
| SEP. | | | | | | | | | | | | |
| 12... | -- | -- | 550 | 120 | 98 | 75 | 130 | 2.4 | 34 | 1.6 | 12 | 320 |
| 27... | -- | -- | 550 | 130 | 96 | 75 | 130 | 2.4 | 34 | 2.6 | 10 | 350 |
| OCT. | | | | | | | | | | | | |
| 04... | -- | -- | 460 | 51 | 64 | 73 | 130 | 2.6 | 38 | 2.3 | 10 | 330 |
| 09... | -- | -- | 490 | 74 | 72 | 76 | 140 | 2.7 | 38 | 1.1 | 11 | 350 |
| 17... | -- | -- | 540 | 130 | 99 | 72 | 120 | 2.2 | 32 | 2.3 | 9.9 | 340 |
| 23... | -- | -- | 490 | 59 | 80 | 70 | 130 | 2.6 | 37 | 2.5 | 10 | 330 |
| 31... | -- | -- | 560 | 110 | 100 | 76 | 130 | 2.4 | 33 | 2.9 | 11 | 340 |
| NOV. | | | | | | | | | | | | |
| 05... | -- | -- | 570 | 120 | 100 | 77 | 130 | 2.4 | 33 | 2.3 | 10 | 350 |
| 20... | -- | -- | 540 | 68 | 99 | 72 | 140 | 2.6 | 36 | 2.6 | 11 | 350 |
| DEC. | | | | | | | | | | | | |
| 05... | .00 | .2 | 560 | 120 | 100 | 74 | 120 | 2.2 | 32 | 1.8 | 11 | 330 |
| 17... | .01 | .5 | 580 | 140 | 100 | 79 | 120 | 2.2 | 31 | 1.5 | 11 | 330 |
| JAN., 1975 | | | | | | | | | | | | |
| 03... | .00 | .1 | 550 | 120 | 95 | 76 | 120 | 2.2 | 32 | 1.7 | 10 | 330 |
| 15... | .00 | .1 | 530 | 110 | 97 | 70 | 120 | 2.3 | 33 | 2.0 | 9.3 | 320 |
| FEB. | | | | | | | | | | | | |
| 03... | .00 | .1 | 550 | 120 | 100 | 74 | 120 | 2.2 | 32 | 2.3 | 12 | 350 |

09306058 - WILLOW CREEK NEAR RIO BLANCO, CO.

WATER QUALITY DATA

| DATE | DIS-SOLVED FLUO-RIDE (F) (MG/L) (00950) | DIS-SOLVED SILICA (SIO2) (MG/L) (00955) | DIS-SOLVED ARSENIC (AS) (UG/L) (01000) | DIS-SOLVED BARIUM (BA) (UG/L) (01005) | DIS-SOLVED BERYL-LIUM (BE) (UG/L) (01010) | DIS-SOLVED BISMUTH (BI) (UG/L) (01015) | DIS-SOLVED BORON (B) (UG/L) (01020) | DIS-SOLVED CAD-MIUM (CD) (UG/L) (01025) | DIS-SOLVED CHRO-MIUM (CR) (UG/L) (01030) | DIS-SOLVED COBALT (CO) (UG/L) (01035) | DIS-SOLVED COPPER (CU) (UG/L) (01040) | DIS-SOLVED IRON (FE) (UG/L) (01046) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 23... | .5 | 15 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 150 |
| MAY | | | | | | | | | | | | |
| 03... | .5 | 17 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 40 |
| 17... | .3 | 17 | 1 | -- | -- | -- | -- | -- | -- | -- | -- | 20 |
| 24... | .3 | 16 | 1 | 55 | <6 | <13 | 120 | 0 | <9 | <20 | <4 | 20 |
| 31... | 1.3 | 15 | 2 | 0 | -- | -- | 130 | 1 | -- | -- | 2 | 30 |
| JUNE | | | | | | | | | | | | |
| 14... | .4 | 17 | 1 | 200 | -- | -- | 140 | 0 | -- | -- | 2 | 90 |
| 25... | .4 | 16 | 1 | <100 | -- | -- | 120 | 6 | -- | -- | 17 | 40 |
| JULY | | | | | | | | | | | | |
| 02... | .3 | 15 | 3 | <100 | -- | -- | 120 | 0 | -- | -- | 1 | 20 |
| 11... | .3 | 17 | 2 | <100 | -- | -- | 130 | 2 | -- | -- | 9 | 20 |
| 26... | .3 | 16 | 0 | 0 | -- | -- | 60 | 1 | -- | -- | 8 | 60 |
| AUG. | | | | | | | | | | | | |
| 03... | .3 | 15 | 1 | 0 | -- | -- | 130 | 1 | -- | -- | 6 | 40 |
| 10... | .3 | 18 | 1 | 0 | -- | -- | 130 | 1 | -- | -- | 5 | 20 |
| SEP. | | | | | | | | | | | | |
| 16... | .4 | 18 | 1 | 0 | -- | -- | 130 | <1 | -- | -- | 3 | 40 |
| 27... | .4 | 14 | 1 | 0 | -- | -- | 110 | <1 | -- | -- | 1 | 50 |
| OCT. | | | | | | | | | | | | |
| 04... | .4 | 17 | 1 | 0 | -- | -- | 70 | 0 | -- | -- | 2 | 20 |
| 09... | .4 | 18 | 2 | 0 | -- | -- | 140 | <1 | -- | -- | 2 | 40 |
| 17... | .4 | 17 | 1 | <100 | -- | -- | 90 | 0 | -- | -- | 0 | 20 |
| 23... | .5 | 18 | 1 | 0 | -- | -- | 160 | 0 | -- | -- | 0 | 40 |
| 31... | .4 | 15 | 1 | <100 | -- | -- | 80 | 0 | -- | -- | 0 | 20 |
| NOV. | | | | | | | | | | | | |
| 06... | .2 | 8.2 | 0 | <100 | -- | -- | 150 | 1 | -- | -- | 2 | 320 |
| 20... | .4 | 17 | 2 | <100 | -- | -- | 70 | 0 | -- | -- | 1 | 30 |
| DEC. | | | | | | | | | | | | |
| 05... | .3 | 16 | 1 | 95 | <2 | <6 | 65 | <20 | <6 | <6 | 3 | 300 |
| 17... | .4 | 16 | 1 | <100 | -- | -- | 120 | 1 | <10 | -- | 0 | 10 |
| JAN., 1975 | | | | | | | | | | | | |
| 03... | .4 | 15 | 0 | <100 | -- | -- | 110 | 0 | 0 | -- | 0 | 0 |
| 15... | .4 | 16 | 1 | 0 | -- | -- | 120 | 0 | 10 | -- | 2 | 40 |
| FEB. | | | | | | | | | | | | |
| 03... | .3 | 17 | 4 | 100 | -- | -- | 110 | 1 | 0 | -- | 4 | 10 |

09306058 - WILLOW CREEK AR RIO BLANCO. CO.

PROCESS DATE /03/75
DISTRICT CODE 08

WATER QUALITY DATA

| DATE | DIS-SOLVED LEAD (PB) (UG/L) (01049) | DIS-SOLVED MAN-GANESE (MN) (UG/L) (01056) | DIS-SOLVED MOLYB-DENUM (MO) (UG/L) (01060) | DIS-SOLVED NICKEL (NI) (UG/L) (01065) | DIS-SOLVED SILVER (AG) (UG/L) (01075) | DIS-SOLVED STRON-TIUM (SR) (UG/L) (01080) | DIS-SOLVED VANA-DIUM (V) (UG/L) (01085) | DIS-SOLVED ZINC (ZN) (UG/L) (01090) | DIS-SOLVED TIN (SN) (UG/L) (01100) | DIS-SOLVED ALUM-INUM (AL) (UG/L) (01106) | DIS-SOLVED GALLIUM (GA) (UG/L) (01120) | DIS-SOLVED GER-MANIUM (GE) (UG/L) (01125) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 23... | -- | 30 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MAY | | | | | | | | | | | | |
| 03... | -- | 20 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 17... | -- | 40 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 24... | <20 | 20 | <6 | <9 | <2 | 3000 | <9.0 | 8 | <13 | 50 | <9 | <20 |
| 31... | 3 | 10 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- |
| JUNE | | | | | | | | | | | | |
| 14... | 8 | 0 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- |
| 25... | 4 | 20 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- |
| JULY | | | | | | | | | | | | |
| 02... | 3 | 0 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- |
| 11... | 5 | 20 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- |
| 25... | 3 | 50 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- |
| AUG. | | | | | | | | | | | | |
| 03... | 2 | 20 | -- | -- | -- | -- | -- | 40 | -- | -- | -- | -- |
| 15... | 3 | 20 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- |
| SEP. | | | | | | | | | | | | |
| 12... | 2 | 0 | -- | -- | -- | -- | -- | 0 | -- | -- | -- | -- |
| 27... | 2 | 0 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- |
| OCT. | | | | | | | | | | | | |
| 04... | 1 | 0 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- |
| 09... | 7 | 0 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- |
| 17... | 3 | 0 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- |
| 23... | 3 | 10 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- |
| 31... | 1 | 0 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- |
| NOV. | | | | | | | | | | | | |
| 05... | 5 | 10 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- |
| 20... | 1 | 20 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- |
| DEC. | | | | | | | | | | | | |
| 05... | <6 | 70 | 3 | <4 | 0 | 3500 | <3.0 | 20 | <6 | 320 | <3 | <5 |
| 17... | 1 | 0 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- |
| JAN., 1975 | | | | | | | | | | | | |
| 03... | 1 | 20 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- |
| 15... | 3 | 10 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- |
| FEB. | | | | | | | | | | | | |
| 03... | 2 | 30 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- |

09306058 - WILLOW CRE NEAR RIO BLANCO, CO.

WATER QUALITY DATA

| DATE | DIS-SOLVED LITHIUM (LI) (UG/L) (01130) | DIS-SOLVED SELE-NIUM (SE) (UG/L) (01145) | DIS-SOLVED TI-TANIUM (TI) (UG/L) (01150) | DIS-SOLVED ZIR-CONIUM (ZR) (UG/L) (01160) | DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L) (70301) | DIS-SOLVED SOLIDS (TONS PER DAY) (70302) | DIS-SOLVED SOLIDS (TONS PER AC-FT) (70303) | TOTAL ORTHO PHOS-PHORUS (P) (MG/L) (70507) | DIS_SOLVED AMMONIA (NH4) (MG/L) (71845) |
|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | |
| 23... | -- | -- | -- | -- | 1100 | 3.24 | 1.50 | -- | -- |
| MAY | | | | | | | | | |
| 03... | -- | -- | -- | -- | 1080 | 4.87 | 1.47 | -- | -- |
| 17... | -- | 1 | -- | -- | 976 | 2.90 | 1.33 | -- | -- |
| 22... | 8 | 1 | <9 | <30 | 964 | 2.81 | 1.31 | -- | -- |
| 31... | 10 | 1 | -- | -- | 953 | 2.91 | 1.30 | -- | -- |
| JUNE | | | | | | | | | |
| 14... | 10 | 1 | -- | -- | 933 | 1.69 | 1.27 | -- | -- |
| 26... | 10 | 1 | -- | -- | 941 | 2.52 | 1.28 | -- | -- |
| JULY | | | | | | | | | |
| 02... | 0 | 1 | -- | -- | 938 | 2.00 | 1.28 | -- | -- |
| 11... | 0 | 2 | -- | -- | 973 | 3.49 | 1.32 | -- | -- |
| 20... | 0 | 1 | -- | -- | 934 | 2.37 | 1.27 | -- | -- |
| AUG. | | | | | | | | | |
| 03... | 0 | 2 | -- | -- | 956 | 4.65 | 1.30 | -- | -- |
| 10... | 0 | 0 | -- | -- | 1150 | 5.55 | 1.55 | -- | -- |
| SEP. | | | | | | | | | |
| 12... | 0 | 1 | -- | -- | 919 | 2.83 | 1.25 | -- | -- |
| 27... | 0 | 2 | -- | -- | 947 | 1.45 | 1.29 | -- | -- |
| OCT. | | | | | | | | | |
| 04... | 0 | 1 | -- | -- | 875 | -- | 1.19 | -- | -- |
| 09... | 0 | 1 | -- | -- | 925 | 1.40 | 1.25 | -- | -- |
| 17... | 0 | 1 | -- | -- | 914 | 1.43 | 1.24 | -- | -- |
| 23... | 0 | 1 | -- | -- | 895 | 1.85 | 1.22 | -- | -- |
| 31... | 0 | 0 | -- | -- | 948 | -- | 1.29 | -- | -- |
| NOV. | | | | | | | | | |
| 06... | 0 | 1 | -- | -- | 950 | 2.39 | 1.29 | -- | -- |
| 20... | 0 | 1 | -- | -- | 982 | 3.92 | 1.34 | -- | -- |
| DEC. | | | | | | | | | |
| 05... | 5 | 1 | 10 | <13 | 922 | 8.34 | 1.25 | .52 | .09 |
| 17... | 10 | 1 | -- | -- | 924 | 7.19 | 1.25 | .03 | .06 |
| JAN., 1975 | | | | | | | | | |
| 03... | 10 | 2 | -- | -- | 908 | 5.91 | 1.23 | .04 | .04 |
| 15... | 10 | 1 | -- | -- | 890 | 5.05 | 1.21 | .04 | .03 |
| FEB. | | | | | | | | | |
| 03... | 0 | 1 | -- | -- | 940 | -- | 1.28 | .00 | .10 |

09306058 - WILLOW CR NEAR RIO BLANCO, CO.

WATER QUALITY DATA

| DATE | DIS- SOLVED NITRATE (NO3) (MG/L) (71851) | DIS- SOLVED NITRITE (NO2) (MG/L) (71856) | DIS- SOLVED MERCURY (HG) (UG/L) (71890) | ELEV. OF LAND SURFACE DATUM (FT. ABOVE MSL) (72000) |
|---|---|---|---|---|
| APR., 1974 | | | | |
| 23... | -- | -- | -- | 6273 |
| MAY | | | | |
| 03... | -- | -- | -- | 6273 |
| 17... | -- | -- | .0 | 6273 |
| 22... | -- | -- | .0 | 6273 |
| 31... | -- | -- | .0 | 6273 |
| JUNE | | | | |
| 14... | -- | -- | .0 | 6273 |
| 26... | -- | -- | .1 | 6273 |
| JULY | | | | |
| 02... | -- | -- | .0 | 6273 |
| 11... | -- | -- | .0 | 6273 |
| 20... | -- | -- | .0 | 6273 |
| AUG. | | | | |
| 03... | -- | -- | .0 | 6273 |
| 10... | -- | -- | .0 | 6273 |
| SEP. | | | | |
| 12... | -- | -- | .2 | 6273 |
| 27... | -- | -- | .0 | 6273 |
| OCT. | | | | |
| 04... | -- | -- | .0 | 6273 |
| 09... | -- | -- | .0 | 6273 |
| 17... | -- | -- | .0 | 6273 |
| 23... | -- | -- | .0 | 6273 |
| 31... | -- | -- | .0 | 6273 |
| NOV. | | | | |
| 06... | -- | -- | .0 | 6273 |
| 20... | -- | -- | .0 | 6273 |
| DEC. | | | | |
| 06... | 1.8 | .00 | <.1 | 6273 |
| 17... | 1.8 | .00 | <.1 | 6273 |
| JAN., 1975 | | | | |
| 03... | 1.9 | .00 | .2 | 6273 |
| 16... | 2.7 | .03 | .0 | 6273 |
| FEB. | | | | |
| 03... | 1.9 | .00 | .2 | 6273 |

09306061 - PICEANCE CREEK AB HUNTER C, NEAR RIO BLANCO, CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | TIME | TYPE | SAMPLE NUMBER (00008) | TEMPERATURE (DEG C) (00010) | INSTANTANEOUS DISCHARGE (CFS) (00061) | TURBIDITY (JTU) (00070) | COLOR (PLATINUM-COBALT UNITS) (00080) | SPECIFIC CONDUCTANCE (MICROMHOS) (00095) | CHEMICAL OXYGEN DEMAND (HIGH LEVEL) (MG/L) (00340) | PH (UNITS) (00400) | CARBON DIOXIDE (CO2) (MG/L) (00405) | ALKALINITY AS CACO3 (MG/L) (00410) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [illegible] 1974 | | | | | | | | | | | | |
| 13... | 1815 | 2 | -- | 14.0 | 29 | -- | -- | 1190 | -- | 8.2 | 5.3 | 430 |
| [illegible] | 1545 | 2 | -- | 7.5 | 30 | -- | -- | 1140 | -- | 8.2 | 5.2 | 419 |
| [illegible] | 1400 | 2 | -- | 11.0 | 6.3 | -- | -- | 1510 | -- | 8.1 | 5.0 | 518 |
| [illegible] | 1345 | 2 | 1834 | 16.0 | 6.2 | -- | -- | 1590 | -- | 8.2 | 6.8 | 553 |
| [illegible] | 1345 | 2 | -- | 18.0 | 6.0 | -- | -- | 1560 | -- | 8.2 | 6.5 | 550 |
| [illegible] | 1410 | 2 | -- | 21.5 | 4.6 | -- | -- | 1540 | -- | 8.2 | 6.4 | 522 |
| [illegible] | [illegible] | 2 | -- | 23.0 | 5.5 | -- | -- | 1540 | -- | 8.2 | 6.5 | 527 |
| [illegible] | 1730 | 2 | -- | 20.0 | 4.6 | -- | -- | 1660 | -- | 8.0 | 11 | 549 |
| [illegible] | 1115 | 2 | -- | 16.0 | 6.0 | -- | -- | 1630 | -- | 8.2 | 7.0 | 546 |
| [illegible] | 1230 | 2 | -- | 21.0 | 4.6 | -- | -- | 1580 | -- | 7.9 | 12 | 509 |
| [illegible] | 1215 | 2 | -- | 14.5 | 31 | -- | -- | 1140 | -- | 7.6 | 20 | 403 |
| [illegible] | 1415 | 2 | -- | 18.0 | 19 | -- | -- | 1340 | -- | 8.1 | 7.6 | 493 |
| [illegible] | 1400 | 2 | -- | 20.0 | 13 | -- | -- | 1360 | -- | -- | -- | 479 |
| [illegible] | 1445 | 2 | -- | 19.0 | 17 | -- | -- | 1320 | -- | -- | -- | 458 |
| [illegible] | 1245 | 2 | -- | 13.5 | -- | -- | -- | 1180 | -- | 8.1 | 5.5 | 353 |
| [illegible] | 1530 | 2 | -- | 15.5 | 10 | -- | -- | 1330 | -- | -- | -- | 452 |
| [illegible] | 1510 | 2 | -- | 14.0 | -- | -- | -- | 1500 | -- | -- | -- | 504 |
| [illegible] | 1230 | 2 | -- | 14.0 | 6.3 | -- | -- | 1470 | -- | -- | -- | 502 |
| [illegible] | [illegible]5 | 2 | -- | 10.0 | 6.2 | -- | -- | 1550 | -- | -- | -- | 542 |
| [illegible] | 1200 | 2 | -- | 8.0 | -- | -- | -- | 1560 | -- | -- | -- | 544 |
| [illegible] | 1315 | 2 | -- | 10.0 | 5.6 | -- | -- | 1490 | -- | -- | -- | 509 |
| [illegible] | 1230 | 2 | -- | 6.5 | -- | -- | -- | 1340 | -- | -- | -- | 470 |
| [illegible] | 1200 | 2 | -- | 5.0 | 19 | 50 | 5 | 4000 | 12 | 8.3 | 4.5 | 463 |

09306061 - PICEANCE CREEK AB HUNTER C. NEAR RIO BLANCO. CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | BICAR-BONATE (HCO3) (MG/L) (00440) | CAR-BONATE (CO3) (MG/L) (00445) | OIL AND GREASE (MG/L) (00550) | DIS-SOLVED AMMONIA NITRO-GEN (N) (MG/L) (00608) | DIS-SOLVED NITRITE (N) (MG/L) (00613) | DIS-SOLVED NITRATE (N) (MG/L) (00618) | TOTAL KJEL-DAHL NITRO-GEN (N) (MG/L) (00625) | DIS-SOLVED NITRITE PLUS NITRATE (N) (MG/L) (00631) | DIS-SOLVED ORTHO PHOS-PHATE (PO4) (MG/L) (00660) | TOTAL PHOS-PHORUS (P) (MG/L) (00665) | DIS-SOLVED ORTHO. PHOS-PHORUS (P) (MG/L) (00671) | CYANIDE (CN) (MG/L) (00720) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 23... | 524 | 0 | -- | -- | -- | -- | -- | .60 | .12 | -- | .04 | -- |
| MAY | | | | | | | | | | | | |
| 03... | 511 | 0 | -- | -- | -- | -- | -- | .64 | .03 | -- | .01 | -- |
| 17... | 631 | 0 | -- | -- | -- | -- | -- | .62 | .12 | -- | .04 | -- |
| 22... | 674 | 0 | -- | -- | -- | -- | -- | .35 | .15 | -- | .05 | -- |
| [illegible]... | 671 | 0 | -- | -- | -- | -- | -- | .15 | .09 | -- | .03 | -- |
| JUNE | | | | | | | | | | | | |
| [illegible]... | 535 | 0 | -- | -- | -- | -- | -- | .08 | .06 | -- | .02 | -- |
| 21... | 543 | 0 | -- | -- | -- | -- | -- | .06 | .03 | -- | .01 | -- |
| [illegible]... | 56[illegible] | 0 | -- | -- | -- | -- | -- | .13 | .09 | -- | .03 | -- |
| JULY | | | | | | | | | | | | |
| 2... | 520 | 0 | -- | -- | -- | -- | -- | .19 | .00 | -- | .00 | -- |
| 12... | 619 | 0 | -- | -- | -- | -- | -- | .22 | .21 | -- | .07 | -- |
| [illegible]... | 491 | 0 | -- | -- | -- | -- | -- | .66 | .09 | -- | .03 | -- |
| AUG. | | | | | | | | | | | | |
| [illegible]... | 601 | 0 | -- | -- | -- | -- | -- | .78 | .18 | -- | .06 | -- |
| 15... | 584 | -- | -- | -- | -- | -- | -- | .32 | .03 | -- | .01 | -- |
| 31... | 555 | -- | -- | -- | -- | -- | -- | .33 | .09 | -- | .03 | -- |
| SEP. | | | | | | | | | | | | |
| [illegible]... | 443 | -- | -- | -- | -- | -- | -- | .42 | .06 | -- | .02 | -- |
| 26... | 551 | -- | -- | -- | -- | -- | -- | .35 | .09 | -- | .03 | -- |
| OCT. | | | | | | | | | | | | |
| [illegible]... | 615 | -- | -- | -- | -- | -- | -- | .31 | .18 | -- | .06 | -- |
| 17... | 612 | -- | -- | -- | -- | -- | -- | .29 | .09 | -- | .03 | -- |
| 24... | 661 | -- | -- | -- | -- | -- | -- | .27 | .12 | -- | .04 | -- |
| 31... | 663 | -- | -- | -- | -- | -- | -- | .19 | .09 | -- | .03 | -- |
| NOV. | | | | | | | | | | | | |
| [illegible]... | 420 | -- | -- | -- | -- | -- | -- | .18 | .03 | -- | .01 | -- |
| [illegible]... | 573 | -- | -- | -- | -- | -- | -- | .55 | .03 | -- | .01 | -- |
| DEC. | | | | | | | | | | | | |
| [illegible]... | 555 | 0 | 8 | .08 | .01 | .64 | 1.4 | .65 | .06 | .13 | .02 | .00 |

PROCESS DATE 02/[illegible]3/75

09306061 - PICEANCE CREEK AB HUNTER C, NEAR RIO BLANCO, CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | DIS-SOLVED SULFIDE (S) (MG/L) (00745) | HARDNESS (CA,MG) (MG/L) (00900) | NON-CARBONATE HARDNESS (MG/L) (00902) | DIS-SOLVED CALCIUM (CA) (MG/L) (00915) | DIS-SOLVED MAGNESIUM (MG) (MG/L) (00925) | DIS-SOLVED SODIUM (NA) (MG/L) (00930) | SODIUM AD-SORPTION RATIO (00931) | PERCENT SODIUM (00932) | DIS-SOLVED POTASSIUM (K) (MG/L) (00935) | DIS-SOLVED CHLORIDE (CL) (MG/L) (00940) | DIS-SOLVED SULFATE (SO4) (MG/L) (00945) | DIS-SOLVED FLUORIDE (F) (MG/L) (00950) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 23... | -- | 410 | 0 | 75 | 55 | 120 | 2.6 | 38 | 3.3 | 13 | 220 | 1.0 |
| MAY | | | | | | | | | | | | |
| 03... | -- | 490 | 0 | 73 | 54 | 120 | 2.6 | 39 | 3.7 | 11 | 220 | .9 |
| 17... | -- | 510 | 0 | 79 | 76 | 170 | 3.3 | 42 | 3.8 | 14 | 350 | .7 |
| 22... | -- | 540 | 0 | 83 | 82 | 180 | 3.4 | 42 | 3.9 | 15 | 350 | .6 |
| 31... | -- | 540 | 0 | 84 | 81 | 180 | 3.4 | 42 | 4.2 | 15 | 350 | 1.5 |
| JUNE | | | | | | | | | | | | |
| 14... | -- | 520 | 0 | 77 | 80 | 180 | 3.4 | 43 | 4.2 | 16 | 330 | .7 |
| 21... | -- | 520 | 0 | 78 | 79 | 180 | 3.4 | 43 | 4.0 | 15 | 340 | .6 |
| 26... | -- | 540 | 0 | 77 | 84 | 200 | 3.8 | 44 | 6.4 | 16 | 340 | .7 |
| JULY | | | | | | | | | | | | |
| 02... | -- | 570 | 6 | 84 | 88 | 180 | 3.3 | 40 | 3.6 | 15 | 350 | .6 |
| 11... | -- | 530 | 22 | 77 | 82 | 200 | 3.8 | 45 | 4.1 | 16 | 380 | .7 |
| 2[illegible]... | -- | 370 | 0 | 72 | 47 | 120 | 2.7 | 41 | 5.5 | 13 | 220 | .5 |
| AUG. | | | | | | | | | | | | |
| 1... | -- | 450 | 0 | 79 | 62 | 150 | 3.1 | 42 | 4.3 | 15 | 270 | .7 |
| [illegible]... | -- | 440 | 0 | 67 | 65 | 160 | 3.3 | 44 | 4.7 | 15 | 260 | .3 |
| 31... | -- | 450 | 0 | 75 | 64 | 150 | 3.1 | 42 | 4.2 | 15 | 280 | .7 |
| SEP. | | | | | | | | | | | | |
| 2[illegible]... | -- | 450 | 82 | 73 | 64 | 150 | 3.1 | 42 | 2.5 | 13 | 280 | .7 |
| 26... | -- | 470 | 16 | 77 | 67 | 140 | 2.8 | 39 | 3.6 | 12 | 280 | .8 |
| OCT. | | | | | | | | | | | | |
| 14... | -- | 430 | 0 | 59 | 69 | 180 | 3.8 | 48 | 1.2 | 14 | 300 | .7 |
| 17... | -- | 490 | 0 | 82 | 69 | 180 | 3.5 | 44 | 3.8 | 14 | 320 | .6 |
| 24... | -- | 530 | 0 | 83 | 78 | 170 | 3.2 | 41 | 4.3 | 14 | 330 | .5 |
| 31... | -- | 560 | 11 | 87 | 82 | 180 | 3.3 | 41 | 3.5 | 15 | 330 | .7 |
| NOV. | | | | | | | | | | | | |
| 05... | -- | 520 | 13 | 85 | 75 | 170 | 3.2 | 41 | 4.0 | 15 | 330 | .5 |
| [illegible]... | -- | 450 | 0 | 81 | 60 | 150 | 3.1 | 42 | 3.0 | 13 | 250 | .7 |
| DEC. | | | | | | | | | | | | |
| [illegible]... | .2 | 440 | 26 | 87 | 66 | 140 | 2.8 | 38 | 2.6 | 12 | 290 | .6 |

09306061 - PICEANCE CREEK AB HUNTER C. NEAR RIO BLANCO, CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | DIS-SOLVED SILICA (SIO2) (MG/L) (00955) | DIS-SOLVED ARSENIC (AS) (UG/L) (01000) | DIS-SOLVED BARIUM (BA) (UG/L) (01005) | DIS-SOLVED BERYL-LIUM (BE) (UG/L) (01010) | DIS-SOLVED BISMUTH (BI) (UG/L) (01015) | DIS-SOLVED BORON (B) (UG/L) (01020) | DIS-SOLVED CAD-MIUM (CD) (UG/L) (01025) | DIS-SOLVED CHRO-MIUM (CR) (UG/L) (01030) | DIS-SOLVED COBALT (CO) (UG/L) (01035) | DIS-SOLVED COPPER (CU) (UG/L) (01040) | DIS-SOLVED IRON (FE) (UG/L) (01045) | DIS-SOLVED LEAD (PB) (UG/L) (01049) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [illegible] 1974 | | | | | | | | | | | | |
| 23... | 16 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 110 | -- |
| [illegible] | | | | | | | | | | | | |
| [illegible] | 17 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 20 | -- |
| 17... | 19 | 1 | -- | -- | -- | -- | -- | -- | -- | -- | 20 | -- |
| [illegible] | 15 | 2 | 70 | <7 | <14 | 190 | 0 | <10 | <20 | <5 | 50 | <20 |
| [illegible] | 17 | 3 | 0 | -- | -- | 240 | 1 | -- | -- | 2 | 20 | 7 |
| 14... | 16 | 3 | 100 | -- | -- | 240 | 1 | -- | -- | 9 | 20 | 8 |
| [illegible] | 16 | 3 | 0 | -- | -- | 240 | 0 | -- | -- | 2 | 20 | 5 |
| [illegible] | 15. | 3 | <100 | -- | -- | 240 | 1 | -- | -- | 3 | 50 | 4 |
| JULY | | | | | | | | | | | | |
| [illegible] | 17 | 6 | <100 | -- | -- | 250 | 0 | -- | -- | 1 | 30 | 2 |
| [illegible] | 14 | 4 | <100 | -- | -- | 270 | 2 | -- | -- | 5 | 20 | 3 |
| [illegible] | 16 | 3 | 0 | -- | -- | 320 | 1 | -- | -- | 20 | 130 | 4 |
| [illegible] | | | | | | | | | | | | |
| [illegible] | [illegible] | 3 | 0 | -- | -- | 230 | <1 | -- | -- | 3 | 70 | 2 |
| [illegible] | 19 | 2 | 0 | -- | -- | 240 | 2 | -- | -- | 6 | 40 | 1 |
| [illegible] | 16 | 2 | 100 | -- | -- | 220 | <1 | -- | -- | 6 | 830 | 8 |
| [illegible] | | | | | | | | | | | | |
| [illegible] | 17 | 4 | 0 | -- | -- | 200 | 1 | -- | -- | 7 | 50 | 1 |
| [illegible] | 18 | [illegible] | 0 | -- | -- | 180 | <1 | -- | -- | 5 | 40 | 2 |
| [illegible] | | | | | | | | | | | | |
| [illegible] | 20 | 2 | 0 | -- | -- | 270 | 0 | -- | -- | 4 | 10 | 0 |
| 17... | 19 | 2 | <100 | -- | -- | 200 | 0 | -- | -- | 0 | 30 | 3 |
| [illegible] | 19 | 2 | 0 | -- | -- | 230 | 0 | -- | -- | 2 | 30 | 2 |
| 31... | 19 | 1 | <100 | -- | -- | 170 | 0 | -- | -- | 2 | 10 | 0 |
| [illegible] | | | | | | | | | | | | |
| [illegible] | 17 | 2 | <100 | -- | -- | 220 | 5 | -- | -- | 2 | 450 | 5 |
| [illegible] | 17 | 4 | <100 | -- | -- | 200 | 0 | -- | -- | 0 | 10 | 2 |
| DEC. | | | | | | | | | | | | |
| [illegible] | 15 | 3 | <100 | -- | -- | 220 | 1 | 0 | -- | 2 | 110 | 1 |

09306061 - PICEANCE CREEK AB HUNTER C, NEAR RIO BLANCO, CO. DISTRICT CODE 04

WATER QUALITY DATA

| DATE | DIS-SOLVED MAN-GANESE (MN) (UG/L) (01056) | DIS-SOLVED MOLYB-DENUM (MO) (UG/L) (01060) | DIS-SOLVED NICKEL (NI) (UG/L) (01065) | DIS-SOLVED SILVER (AG) (UG/L) (01075) | DIS-SOLVED STRON-TIUM (SR) (UG/L) (01080) | DIS-SOLVED VANA-DIUM (V) (UG/L) (01085) | DIS-SOLVED ZINC (ZN) (UG/L) (01090) | DIS-SOLVED TIN (SN) (UG/L) (01100) | DIS-SOLVED ALUM-INUM (AL) (UG/L) (01106) | DIS-SOLVED GALLIUM (GA) (UG/L) (01120) | DIS-SOLVED GER-MANIUM (GE) (UG/L) (01125) | DIS-SOLVED LITHIUM (LI) (UG/L) (01130) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 23... | 30 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MAY | | | | | | | | | | | | |
| 3... | 1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 17... | 60 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| [illegible]... | 70 | 7 | <10 | <3 | 2400 | <10 | <10 | <15 | 50 | <10 | <20 | 6 |
| 31... | 100 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- | 10 |
| JUNE | | | | | | | | | | | | |
| 1[illegible]... | 100 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- | 10 |
| 21... | 110 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- | 10 |
| 25... | 140 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- | 0 |
| JULY | | | | | | | | | | | | |
| 2... | 150 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- | 0 |
| 11... | 150 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- | 0 |
| [illegible]... | 70 | -- | -- | -- | -- | -- | 50 | -- | -- | -- | -- | 0 |
| AUG. | | | | | | | | | | | | |
| 1[illegible]... | 60 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- | 0 |
| 15... | 60 | -- | -- | -- | -- | -- | 0 | -- | -- | -- | -- | 0 |
| 31... | 10 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- | 0 |
| SEP. | | | | | | | | | | | | |
| [illegible]... | 60 | -- | -- | -- | -- | -- | 40 | -- | -- | -- | -- | 0 |
| [illegible]... | 20 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- | 0 |
| OCT. | | | | | | | | | | | | |
| [illegible]... | 0 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- | 0 |
| 17... | 150 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- | 0 |
| 24... | 170 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- | 0 |
| 31... | 140 | -- | -- | -- | -- | -- | 0 | -- | -- | -- | -- | 0 |
| NOV. | | | | | | | | | | | | |
| [illegible]... | 150 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- | 0 |
| 2[illegible]... | 50 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- | 0 |
| DEC. | | | | | | | | | | | | |
| 16... | 40 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- | 10 |

09306061 - PICEANCE CREEK AB H[illegible]R C. NEAR RIO BLANCO, CO. DISTRICT CODE 03

WATER QUALITY DATA

| DATE | DIS-SOLVED SELENIUM (SE) (UG/L) (01145) | DIS-SOLVED TITANIUM (TI) (UG/L) (01150) | DIS-SOLVED ZIRCONIUM (ZR) (UG/L) (01160) | DIS-SOLVED SOLIDS (SUM OF CONSTITUENTS) (MG/L) (70301) | DIS-SOLVED SOLIDS (TONS PER DAY) (70302) | DIS-SOLVED SOLIDS (TONS PER AC-FT) (70303) | TOTAL ORTHO PHOSPHORUS (P) (MG/L) (70507) | DIS_SOLVED AMMONIA (NH4) (MG/L) (71846) | DIS_SOLVED NITRATE (NO3) (MG/L) (71851) | DIS_SOLVED NITRITE (NO2) (MG/L) (71856) | DIS-SOLVED MERCURY (HG) (UG/L) (71890) | ELEV. OF LAND SURFACE DATUM (FT. ABOVE MSL) (72000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 30... | -- | -- | -- | 765 | 69.3 | 1.04 | -- | -- | -- | -- | -- | 6214 |
| MAY | | | | | | | | | | | | |
| 03... | -- | -- | -- | 754 | 61.1 | 1.03 | -- | -- | -- | -- | -- | 6214 |
| 17... | 0 | -- | -- | 1030 | 17.5 | 1.40 | -- | -- | -- | -- | .0 | 6214 |
| 22... | 1 | <10 | <30 | 1070 | 18.0 | 1.46 | -- | -- | -- | -- | .0 | 6214 |
| 31... | 1 | -- | -- | 1060 | 17.4 | 1.44 | -- | -- | -- | -- | .0 | 6214 |
| JUNE | | | | | | | | | | | | |
| 14... | 2 | -- | -- | 1020 | 12.8 | 1.39 | -- | -- | -- | -- | .0 | 6214 |
| 21... | 1 | -- | -- | 1030 | 15.4 | 1.40 | -- | -- | -- | -- | .0 | 6214 |
| 28... | 1 | -- | -- | 1090 | 13.7 | 1.48 | -- | -- | -- | -- | .0 | 6214 |
| JULY | | | | | | | | | | | | |
| 02... | 2 | -- | -- | 1080 | 17.5 | 1.47 | -- | -- | -- | -- | .0 | 6214 |
| 11... | 1 | -- | -- | 1080 | 13.5 | 1.47 | -- | -- | -- | -- | .0 | 6214 |
| [illegible]... | 0 | -- | -- | 736 | 61.6 | 1.00 | -- | -- | -- | -- | .0 | 6214 |
| AUG. | | | | | | | | | | | | |
| [illegible]... | 1 | -- | -- | 901 | 43.4 | 1.23 | -- | -- | -- | -- | .5 | 6214 |
| [illegible]... | 1 | -- | -- | 881 | 30.9 | 1.20 | -- | -- | -- | -- | .0 | 6214 |
| 31... | 1 | -- | -- | 885 | 40.6 | 1.20 | -- | -- | -- | -- | .0 | 6214 |
| SEPT. | | | | | | | | | | | | |
| 20... | 0 | -- | -- | 821 | -- | 1.12 | -- | -- | -- | -- | .0 | 6214 |
| 26... | 1 | -- | -- | 872 | 24.0 | 1.19 | -- | -- | -- | -- | .0 | 6214 |
| OCT. | | | | | | | | | | | | |
| 04... | 1 | -- | -- | 949 | -- | 1.29 | -- | -- | -- | -- | .0 | 6214 |
| 17... | 1 | -- | -- | 992 | 17.1 | 1.35 | -- | -- | -- | -- | .0 | 6214 |
| 22... | 1 | -- | -- | 1030 | 17.5 | 1.40 | -- | -- | -- | -- | .0 | 6214 |
| 31... | 0 | -- | -- | 1050 | -- | 1.43 | -- | -- | -- | -- | .0 | 6214 |
| NOV. | | | | | | | | | | | | |
| 06... | 1 | -- | -- | 1000 | 15.1 | 1.36 | -- | -- | -- | -- | .0 | 6214 |
| 20... | 1 | -- | -- | 870 | -- | 1.18 | -- | -- | -- | -- | .0 | 6214 |
| DEC. | | | | | | | | | | | | |
| 6... | 1 | -- | -- | 887 | 44.9 | 1.21 | .05 | .10 | 2.8 | .03 | <.1 | 6214 |

09306061 - PICEANCE CREEK AB HUNTER C, NEAR RIO BLANCO, CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | TIME | TYPE | SAMPLE NUMBER (00008) | TEMPER-ATURE (DEG C) (00010) | INSTAN-TANEOUS DIS-CHARGE (CFS) (00061) | TUR-BID-ITY (JTU) (00070) | COLOR (PLAT-INUM-COBALT UNITS) (00080) | SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS) (00095) | CHEM-ICAL OXYGEN DEMAND (HIGH LEVEL) (MG/L) (00340) | PH (UNITS) (00400) | CARBON DIOXIDE (CO2) (MG/L) (00405) | ALKA-LINITY AS CACO3 (MG/L) (00410) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 23... | 1815 | 2 | -- | 14.0 | 29 | -- | -- | 1190 | -- | 8.2 | 5.3 | 439 |
| MAY | | | | | | | | | | | | |
| 03... | 1645 | 2 | -- | 7.5 | 30 | -- | -- | 1140 | -- | 8.2 | 5.2 | 419 |
| 17... | 1400 | 2 | -- | 11.0 | 6.3 | -- | -- | 1510 | -- | 8.1 | 6.0 | 518 |
| 22... | 1545 | 2 | 1884 | 16.0 | 6.2 | -- | -- | 1590 | -- | 8.2 | 6.8 | 553 |
| 31... | 1345 | 2 | -- | 18.0 | 6.0 | -- | -- | 1560 | -- | 8.2 | 6.3 | 550 |
| JUNE | | | | | | | | | | | | |
| 14... | 1410 | 2 | -- | 21.5 | 4.6 | -- | -- | 1540 | -- | 8.2 | 6.4 | 522 |
| 21... | 1600 | 2 | -- | 23.0 | 5.5 | -- | -- | 1540 | -- | 8.2 | 6.5 | 527 |
| 26... | 1730 | 2 | -- | 20.0 | 4.6 | -- | -- | 1660 | -- | 8.0 | 11 | 549 |
| JULY | | | | | | | | | | | | |
| 02... | 1115 | 2 | -- | 16.0 | 6.0 | -- | -- | 1630 | -- | 8.2 | 7.0 | 566 |
| 11... | 1330 | 2 | -- | 21.0 | 4.6 | -- | -- | 1580 | -- | 7.9 | 12 | 508 |
| 20... | 1215 | 2 | -- | 14.5 | 31 | -- | -- | 1140 | -- | 7.6 | 20 | 403 |
| AUG. | | | | | | | | | | | | |
| 10... | 1415 | 2 | -- | 18.0 | 19 | -- | -- | 1340 | -- | 8.1 | 7.6 | 493 |
| 16... | 1400 | 2 | -- | 20.0 | 13 | -- | -- | 1360 | -- | -- | -- | 479 |
| 31... | 1445 | 2 | -- | 18.0 | 17 | -- | -- | 1320 | -- | -- | -- | 458 |
| SEP. | | | | | | | | | | | | |
| 20... | 1245 | 2 | -- | 13.5 | -- | -- | -- | 1180 | -- | 8.1 | 5.6 | 353 |
| 23... | 1530 | 2 | -- | 15.5 | 10 | -- | -- | 1330 | -- | -- | -- | 452 |
| OCT. | | | | | | | | | | | | |
| 04... | 1510 | 2 | -- | 14.0 | -- | -- | -- | 1500 | -- | -- | -- | 504 |
| 10... | 1130 | 2 | -- | 12.0 | 5.6 | -- | -- | 1500 | -- | -- | -- | 511 |
| 17... | 1330 | 2 | -- | 14.0 | 6.3 | -- | -- | 1470 | -- | -- | -- | 502 |
| 24... | 1015 | 2 | -- | 10.0 | 6.2 | -- | -- | 1550 | -- | -- | -- | 542 |
| 31... | 1230 | 2 | -- | 8.0 | -- | -- | -- | 1560 | -- | -- | -- | 544 |
| NOV. | | | | | | | | | | | | |
| 05... | 1515 | 2 | -- | 10.0 | 5.6 | -- | -- | 1490 | -- | -- | -- | 509 |
| 20... | 1330 | 2 | -- | 6.5 | -- | -- | -- | 1340 | -- | -- | -- | 470 |
| DEC. | | | | | | | | | | | | |
| 05... | 1200 | 2 | -- | 5.0 | 19 | 80 | 5 | 4000 | 12 | 8.3 | 4.5 | 463 |
| 18... | 1330 | 2 | -- | 2.5 | 35 | 40 | 5 | 1400 | -- | 8.3 | 4.4 | 453 |
| JAN., 1975 | | | | | | | | | | | | |
| 03... | 1200 | 2 | -- | .0 | -- | 20 | 5 | 1000 | -- | 8.4 | 3.6 | 459 |
| 16... | -- | 2 | -- | 1.0 | 14 | 30 | 0 | 1390 | -- | 8.1 | 6.9 | 447 |
| FEB. | | | | | | | | | | | | |
| 03... | 1100 | 2 | -- | .0 | -- | 10 | -- | 1300 | -- | 7.5 | 30 | 485 |

09306061 - PICEANCE C[illegible] AB HUNTER C. NEAR RIO BLANCO. CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | BICAR-BONATE (HCO3) (MG/L) (00440) | CAR-BONATE (CO3) (MG/L) (00445) | OIL AND GREASE (MG/L) (00550) | DIS-SOLVED AMMONIA NITRO-GEN (N) (MG/L) (00608) | DIS-SOLVED NITRITE (N) (MG/L) (00613) | DIS-SOLVED NITRATE (N) (MG/L) (00618) | TOTAL KJEL-DAHL NITRO-GEN (N) (MG/L) (00625) | DIS-SOLVED NITRITE PLUS NITRATE (N) (MG/L) (00631) | DIS-SOLVED ORTHO PHOS-PHATE (PO4) (MG/L) (00660) | TOTAL PHOS-PHORUS (P) (MG/L) (00665) | DIS-SOLVED ORTHO. PHOS-PHORUS (P) (MG/L) (00671) | CYANIDE (CN) (MG/L) (00720) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR.. 1974 | | | | | | | | | | | | |
| 23... | 524 | 0 | -- | -- | -- | -- | -- | .60 | .12 | -- | .04 | -- |
| MAY | | | | | | | | | | | | |
| 03... | 511 | 0 | -- | -- | -- | -- | -- | .64 | .03 | -- | .01 | -- |
| 17... | 631 | 0 | -- | -- | -- | -- | -- | .62 | .12 | -- | .04 | -- |
| 22... | 674 | 0 | -- | -- | -- | -- | -- | .35 | .15 | -- | .05 | -- |
| 31... | 671 | 0 | -- | -- | -- | -- | -- | .15 | .09 | -- | .03 | -- |
| JUNE | | | | | | | | | | | | |
| 14... | 636 | 0 | -- | -- | -- | -- | -- | .08 | .06 | -- | .02 | -- |
| 21... | 643 | 0 | -- | -- | -- | -- | -- | .08 | .03 | -- | .01 | -- |
| 28... | 659 | 0 | -- | -- | -- | -- | -- | .13 | .09 | -- | .03 | -- |
| JULY | | | | | | | | | | | | |
| 02... | 690 | 0 | -- | -- | -- | -- | -- | .19 | .00 | -- | .00 | -- |
| 11... | 614 | 0 | -- | -- | -- | -- | -- | .22 | .21 | -- | .07 | -- |
| 2[illegible]... | 491 | 0 | -- | -- | -- | -- | -- | .68 | .09 | -- | .03 | -- |
| AUG. | | | | | | | | | | | | |
| 10... | 601 | 0 | -- | -- | -- | -- | -- | .78 | .18 | -- | .05 | -- |
| 16... | 584 | -- | -- | -- | -- | -- | -- | .32 | .03 | -- | .01 | -- |
| 31... | 559 | -- | -- | -- | -- | -- | -- | .33 | .09 | -- | .03 | -- |
| SEP. | | | | | | | | | | | | |
| 20... | 443 | -- | -- | -- | -- | -- | -- | .42 | .06 | -- | .02 | -- |
| 25... | 551 | -- | -- | -- | -- | -- | -- | .35 | .09 | -- | .03 | -- |
| OCT. | | | | | | | | | | | | |
| 04... | 615 | -- | -- | -- | -- | -- | -- | .31 | .18 | -- | .06 | -- |
| 10... | 623 | -- | -- | -- | -- | -- | -- | .31 | .03 | -- | .01 | -- |
| 17... | 612 | -- | -- | -- | -- | -- | -- | .29 | .09 | -- | .03 | -- |
| 24... | 561 | -- | -- | -- | -- | -- | -- | .27 | .12 | -- | .04 | -- |
| 31... | 563 | -- | -- | -- | -- | -- | -- | .19 | .09 | -- | .03 | -- |
| NOV. | | | | | | | | | | | | |
| 05... | 520 | -- | -- | -- | -- | -- | -- | .18 | .03 | -- | .01 | -- |
| 20... | 573 | -- | -- | -- | -- | -- | -- | .55 | .03 | -- | .01 | -- |
| DEC. | | | | | | | | | | | | |
| 05... | 565 | 0 | 8 | .08 | .01 | .64 | 1.4 | .65 | .06 | .13 | .02 | .00 |
| 18... | 552 | 0 | 3 | .04 | .00 | .79 | .58 | .79 | .03 | .17 | .01 | .00 |
| JAN.. 1975 | | | | | | | | | | | | |
| 03... | 559 | 0 | 9 | .03 | .00 | .73 | .93 | .73 | .09 | .08 | .03 | .00 |
| 15... | 545 | 0 | 7 | .04 | .01 | .77 | .52 | .78 | .06 | .09 | .02 | .00 |
| FEB. | | | | | | | | | | | | |
| 03... | 591 | 0 | 8 | .04 | .01 | .68 | .46 | .69 | .25 | .11 | .05 | .00 |

09306061 - PICEANCE CR K AB HUNTER C. NEAR RIO BLANCO, CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | DIS-SOL-VED SUL-FIDE (S) (MG/L) (00746) | HARD-NESS (CA,MG) (MG/L) (00900) | NON-CAR-BONATE HARD-NESS (MG/L) (00902) | DIS-SOLVED CAL-CIUM (CA) (MG/L) (00915) | DIS-SOLVED MAG-NE-SIUM (MG) (MG/L) (00925) | DIS-SOLVED SODIUM (NA) (MG/L) (00930) | SODIUM AD-SORP-TION RATIO (00931) | PERCENT SODIUM (00932) | DIS-SOLVED PO-TAS-SIUM (K) (MG/L) (00935) | DIS-SOLVED CHLO-RIDE (CL) (MG/L) (00940) | DIS-SOLVED SULFATE (SO4) (MG/L) (00945) | DIS-SOLVED FLUO-RIDE (F) (MG/L) (00950) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 23... | -- | 410 | 0 | 75 | 55 | 120 | 2.6 | 38 | 3.3 | 13 | 220 | 1.0 |
| MAY | | | | | | | | | | | | |
| 03... | -- | 400 | 0 | 73 | 54 | 120 | 2.6 | 39 | 3.7 | 11 | 220 | .9 |
| 17... | -- | 510 | 0 | 79 | 76 | 170 | 3.3 | 42 | 3.8 | 14 | 350 | .7 |
| 22... | -- | 540 | 0 | 83 | 82 | 180 | 3.4 | 42 | 3.9 | 15 | 350 | .6 |
| 31... | -- | 540 | 0 | 84 | 81 | 180 | 3.4 | 42 | 4.2 | 15 | 350 | 1.5 |
| JUNE | | | | | | | | | | | | |
| 14... | -- | 520 | 0 | 77 | 80 | 180 | 3.4 | 43 | 4.2 | 16 | 330 | .7 |
| 21... | -- | 520 | 0 | 78 | 79 | 180 | 3.4 | 43 | 4.0 | 15 | 340 | .6 |
| 25... | -- | 540 | 0 | 77 | 84 | 200 | 3.8 | 44 | 6.4 | 16 | 360 | .7 |
| JULY | | | | | | | | | | | | |
| 02... | -- | 570 | 6 | 84 | 88 | 180 | 3.3 | 40 | 3.8 | 15 | 350 | .6 |
| 11... | -- | 530 | 22 | 77 | 82 | 200 | 3.8 | 45 | 4.1 | 16 | 380 | .7 |
| 20... | -- | 370 | 0 | 72 | 47 | 120 | 2.7 | 41 | 5.5 | 13 | 220 | .5 |
| AUG. | | | | | | | | | | | | |
| 10... | -- | 450 | 0 | 79 | 62 | 150 | 3.1 | 42 | 4.3 | 15 | 270 | .7 |
| 15... | -- | 440 | 0 | 67 | 65 | 160 | 3.3 | 44 | 4.7 | 15 | 260 | .3 |
| 31... | -- | 450 | 0 | 75 | 64 | 150 | 3.1 | 42 | 4.2 | 15 | 280 | .7 |
| SEP. | | | | | | | | | | | | |
| 20... | -- | 450 | 82 | 73 | 64 | 150 | 3.1 | 42 | 2.5 | 13 | 280 | .7 |
| 25... | -- | 470 | 16 | 77 | 67 | 140 | 2.8 | 39 | 3.6 | 12 | 280 | .8 |
| OCT. | | | | | | | | | | | | |
| 04... | -- | 430 | 0 | 59 | 69 | 180 | 3.8 | 48 | 1.2 | 14 | 300 | .7 |
| 10... | -- | 500 | 0 | 75 | 76 | 170 | 3.3 | 42 | 3.5 | 14 | 290 | .6 |
| 17... | -- | 490 | 0 | 82 | 69 | 180 | 3.5 | 44 | 3.8 | 14 | 320 | .6 |
| 24... | -- | 530 | 0 | 83 | 78 | 170 | 3.2 | 41 | 4.3 | 14 | 330 | .5 |
| 31... | -- | 560 | 11 | 87 | 82 | 180 | 3.3 | 41 | 3.5 | 15 | 330 | .7 |
| NOV. | | | | | | | | | | | | |
| 06... | -- | 520 | 13 | 85 | 75 | 170 | 3.2 | 41 | 4.0 | 15 | 330 | .6 |
| 20... | -- | 450 | 0 | 81 | 60 | 150 | 3.1 | 42 | 3.0 | 13 | 260 | .7 |
| DEC. | | | | | | | | | | | | |
| 06... | .2 | 490 | 26 | 87 | 66 | 140 | 2.8 | 38 | 2.6 | 12 | 280 | .5 |
| 18... | .5 | 450 | 8 | 84 | 61 | 140 | 2.8 | 40 | 2.5 | 12 | 290 | .7 |
| JAN., 1975 | | | | | | | | | | | | |
| 03... | .0 | 500 | 39 | 87 | 68 | 140 | 2.7 | 38 | 2.8 | 13 | 300 | .7 |
| 15... | .0 | 450 | 14 | 79 | 64 | 140 | 2.8 | 40 | 2.6 | 12 | 290 | .7 |
| FEB. | | | | | | | | | | | | |
| 03... | .2 | 500 | 11 | 88 | 67 | 140 | 2.7 | 38 | 2.7 | 13 | 320 | .5 |

09306061 - PICEANCE CREEK AB HUNTER C. NEAR RIO BLANCO, CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | DIS-SOLVED SILICA (SIO2) (MG/L) (00955) | DIS-SOLVED ARSENIC (AS) (UG/L) (01000) | DIS-SOLVED BARIUM (BA) (UG/L) (01005) | DIS-SOLVED BERYL-LIUM (BE) (UG/L) (01010) | DIS-SOLVED BISMUTH (BI) (UG/L) (01015) | DIS-SOLVED BORON (B) (UG/L) (01020) | DIS-SOLVED CAD-MIUM (CD) (UG/L) (01025) | DIS-SOLVED CHRO-MIUM (CR) (UG/L) (01030) | DIS-SOLVED COBALT (CO) (UG/L) (01035) | DIS-SOLVED COPPER (CU) (UG/L) (01040) | DIS-SOLVED IRON (FE) (UG/L) (01045) | DIS-SOLVED LEAD (PB) (UG/L) (01049) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 23... | 15 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 110 | -- |
| MAY | | | | | | | | | | | | |
| 03... | 17 | -- | -- | -- | -- | -- | -- | -- | -- | -- | 20 | -- |
| 17... | 19 | 1 | -- | -- | -- | -- | -- | -- | -- | -- | 20 | -- |
| 22... | 18 | 2 | 70 | <7 | <14 | 190 | 0 | <10 | <20 | <5 | 50 | <20 |
| 31... | 17 | 3 | 0 | -- | -- | 240 | 1 | -- | -- | 2 | 20 | 7 |
| JUNE | | | | | | | | | | | | |
| 14... | 16 | 3 | 100 | -- | -- | 240 | 1 | -- | -- | 9 | 20 | 8 |
| 21... | 16 | 3 | 0 | -- | -- | 240 | 0 | -- | -- | 2 | 20 | 5 |
| 28... | 15 | 3 | <100 | -- | -- | 240 | 1 | -- | -- | 3 | 50 | 4 |
| JULY | | | | | | | | | | | | |
| 02... | 17 | 6 | <100 | -- | -- | 250 | 0 | -- | -- | 1 | 30 | 2 |
| 11... | 14 | 4 | <100 | -- | -- | 270 | 2 | -- | -- | 5 | 20 | 3 |
| 2[illegible]... | 12 | 3 | 0 | -- | -- | 320 | 1 | -- | -- | 20 | 130 | 4 |
| AUG. | | | | | | | | | | | | |
| 10... | 20 | 3 | 0 | -- | -- | 230 | <1 | -- | -- | 3 | 70 | 2 |
| 17... | 19 | 2 | 0 | -- | -- | 240 | 2 | -- | -- | 6 | 40 | 1 |
| 31... | 13 | 2 | 100 | -- | -- | 230 | <1 | -- | -- | 6 | 830 | 8 |
| SEP. | | | | | | | | | | | | |
| 20... | 17 | 4 | 0 | -- | -- | 200 | 1 | -- | -- | 7 | 90 | 1 |
| 25... | 18 | 0 | 0 | -- | -- | 180 | <1 | -- | -- | 6 | 40 | 2 |
| OCT. | | | | | | | | | | | | |
| 04... | 20 | 2 | 0 | -- | -- | 270 | 0 | -- | -- | 4 | 10 | 0 |
| 10... | 19 | 2 | <100 | -- | -- | 230 | 1 | -- | -- | 2 | 50 | 10 |
| 17... | 19 | 2 | <100 | -- | -- | 200 | 0 | -- | -- | 0 | 30 | 3 |
| 24... | 19 | 2 | 0 | -- | -- | 230 | 0 | -- | -- | 2 | 30 | 2 |
| 31... | 19 | 1 | <100 | -- | -- | 170 | 0 | -- | -- | 2 | 10 | 0 |
| NOV. | | | | | | | | | | | | |
| 06... | 17 | 2 | <100 | -- | -- | 220 | 5 | -- | -- | 2 | 450 | 5 |
| 20... | 17 | 4 | <100 | -- | -- | 200 | 0 | -- | -- | 0 | 10 | 2 |
| DEC. | | | | | | | | | | | | |
| 06... | 16 | 3 | <100 | -- | -- | 220 | 1 | 0 | -- | 2 | 110 | 1 |
| 18... | 19 | 2 | <100 | -- | -- | 160 | 2 | 0 | -- | 1 | 10 | 2 |
| JAN., 1975 | | | | | | | | | | | | |
| 03... | 16 | 0 | <100 | -- | -- | 170 | 0 | 0 | -- | 2 | 10 | 3 |
| 16... | 17 | 1 | 0 | -- | -- | 180 | 1 | 10 | -- | 2 | 10 | 6 |
| FEB. | | | | | | | | | | | | |
| 03... | 17 | 5 | <100 | -- | -- | 150 | 1 | 10 | -- | 5 | 30 | 2 |

09306061 - PICEANCE CRE[illegible]B HUNTER C. NEAR RIO BLANCO, CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | DIS-SOLVED MAN-GANESE (MN) (UG/L) (01055) | DIS-SOLVED MOLYB-DENUM (MO) (UG/L) (01060) | DIS-SOLVED NICKEL (NI) (UG/L) (01065) | DIS-SOLVED SILVER (AG) (UG/L) (01075) | DIS-SOLVED STRON-TIUM (SR) (UG/L) (01080) | DIS-SOLVED VANA-DIUM (V) (UG/L) (01085) | DIS-SOLVED ZINC (ZN) (UG/L) (01090) | DIS-SOLVED TIN (SN) (UG/L) (01100) | DIS-SOLVED ALUM-INUM (AL) (UG/L) (01106) | DIS-SOLVED GALLIUM (GA) (UG/L) (01120) | DIS-SOLVED GER-MANIUM (GE) (UG/L) (01125) | DIS-SOLVED LITHIUM (LI) (UG/L) (01130) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 23... | 30 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MAY | | | | | | | | | | | | |
| 03... | 10 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 17... | 60 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| 22... | 70 | 7 | <10 | <3 | 2400 | <10 | <10 | <15 | 50 | <10 | <20 | 6 |
| 31... | 100 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- | 10 |
| JUNE | | | | | | | | | | | | |
| 14... | 100 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- | 10 |
| 21... | 110 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- | 10 |
| 25... | 190 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- | 0 |
| JULY | | | | | | | | | | | | |
| 02... | 150 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- | 0 |
| 11... | 150 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- | 0 |
| 23... | 70 | -- | -- | -- | -- | -- | 50 | -- | -- | -- | -- | 0 |
| AUG. | | | | | | | | | | | | |
| 1[illegible]... | 80 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- | 0 |
| 16... | 50 | -- | -- | -- | -- | -- | 0 | -- | -- | -- | -- | 0 |
| 31... | 10 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- | 0 |
| SEP. | | | | | | | | | | | | |
| 23... | 50 | -- | -- | -- | -- | -- | 40 | -- | -- | -- | -- | 0 |
| 25... | 20 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- | 0 |
| OCT. | | | | | | | | | | | | |
| 04... | 0 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- | 0 |
| 10... | 150 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- | 0 |
| 17... | 150 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- | 0 |
| 24... | 170 | -- | -- | -- | -- | -- | 20 | -- | -- | -- | -- | 0 |
| 31... | 140 | -- | -- | -- | -- | -- | 0 | -- | -- | -- | -- | 0 |
| NOV. | | | | | | | | | | | | |
| 06... | 150 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- | 0 |
| 20... | 60 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- | 0 |
| DEC. | | | | | | | | | | | | |
| [illegible]5... | 40 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- | 10 |
| [illegible]5... | 30 | -- | -- | -- | -- | -- | 0 | -- | -- | -- | -- | 10 |
| JAN., 1975 | | | | | | | | | | | | |
| 03... | 30 | -- | -- | -- | -- | -- | 10 | -- | -- | -- | -- | 10 |
| 16... | 20 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- | 10 |
| FEB. | | | | | | | | | | | | |
| 03... | 40 | -- | -- | -- | -- | -- | 30 | -- | -- | -- | -- | 10 |

09306061 - PICEANCE CREEK AB HUNTER C. NEAR RIO BLANCO, CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | DIS-SOLVED SELE-NIUM (SE) (UG/L) (01145) | DIS-SOLVED TI-TANIUM (TI) (UG/L) (01150) | DIS-SOLVED ZIR-CONIUM (ZR) (UG/L) (01160) | DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L) (70301) | DIS-SOLVED SOLIDS (TONS PER DAY) (70302) | DIS-SOLVED SOLIDS (TONS PER AC-FT) (70303) | TOTAL ORTHO PHOS-PHORUS (P) (MG/L) (70507) | DIS_ SOLVED AMMONIA (NH4) (MG/L) (71846) | DIS_ SOLVED NITRATE (NO3) (MG/L) (71851) | DIS_ SOLVED NITRITE (NO2) (MG/L) (71856) | DIS-SOLVED MERCURY (HG) (UG/L) (71890) | ELEV. OF LAND SURFACE DATUM (FT. ABOVE MSL) (72000) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| APR., 1974 | | | | | | | | | | | | |
| 23... | -- | -- | -- | 765 | 60.3 | 1.04 | -- | -- | -- | -- | -- | 6214 |
| MAY | | | | | | | | | | | | |
| 02... | -- | -- | -- | 754 | 51.1 | 1.03 | -- | -- | -- | -- | -- | 6214 |
| 17... | 0 | -- | -- | 1030 | 17.6 | 1.40 | -- | -- | -- | -- | .0 | 6214 |
| 22... | 1 | <10 | <30 | 1070 | 18.0 | 1.46 | -- | -- | -- | -- | .0 | 6214 |
| 31... | 1 | -- | -- | 1050 | 17.4 | 1.44 | -- | -- | -- | -- | .0 | 6214 |
| JUNE | | | | | | | | | | | | |
| 14... | 2 | -- | -- | 1020 | 12.8 | 1.39 | -- | -- | -- | -- | .0 | 6214 |
| 21... | 1 | -- | -- | 1030 | 15.4 | 1.40 | -- | -- | -- | -- | .0 | 6214 |
| 25... | 1 | -- | -- | 1090 | 13.7 | 1.48 | -- | -- | -- | -- | .0 | 6214 |
| JULY | | | | | | | | | | | | |
| 02... | 2 | -- | -- | 1080 | 17.5 | 1.47 | -- | -- | -- | -- | .0 | 6214 |
| 11... | 1 | -- | -- | 1080 | 13.5 | 1.47 | -- | -- | -- | -- | .0 | 6214 |
| 29... | 0 | -- | -- | 735 | 61.5 | 1.00 | -- | -- | -- | -- | .0 | 6214 |
| AUG. | | | | | | | | | | | | |
| 10... | 1 | -- | -- | 901 | 48.4 | 1.23 | -- | -- | -- | -- | .5 | 6214 |
| 15... | 1 | -- | -- | 881 | 30.9 | 1.20 | -- | -- | -- | -- | .0 | 6214 |
| 31... | 1 | -- | -- | 885 | 40.6 | 1.20 | -- | -- | -- | -- | .0 | 6214 |
| SEP. | | | | | | | | | | | | |
| 20... | 0 | -- | -- | 821 | -- | 1.12 | -- | -- | -- | -- | .0 | 6214 |
| 25... | 1 | -- | -- | 872 | 24.0 | 1.19 | -- | -- | -- | -- | .0 | 6214 |
| OCT. | | | | | | | | | | | | |
| 04... | 1 | -- | -- | 949 | -- | 1.29 | -- | -- | -- | -- | .0 | 6214 |
| 10... | 1 | -- | -- | 957 | 14.7 | 1.30 | -- | -- | -- | -- | .0 | 6214 |
| 17... | 1 | -- | -- | 992 | 17.1 | 1.35 | -- | -- | -- | -- | .0 | 6214 |
| 24... | 1 | -- | -- | 1020 | 17.5 | 1.40 | -- | -- | -- | -- | .0 | 6214 |
| 31... | 0 | -- | -- | 1050 | -- | 1.43 | -- | -- | -- | -- | .0 | 6214 |
| NOV. | | | | | | | | | | | | |
| 05... | 1 | -- | -- | 1000 | 15.1 | 1.36 | -- | -- | -- | -- | .0 | 6214 |
| 20... | 1 | -- | -- | 870 | -- | 1.18 | -- | -- | -- | -- | .0 | 6214 |
| DEC. | | | | | | | | | | | | |
| 06... | 1 | -- | -- | 887 | 45.9 | 1.21 | .06 | .10 | 2.8 | .03 | <.1 | 6214 |
| 18... | 1 | -- | -- | 846 | 84.7 | 1.21 | .05 | .05 | 3.5 | .00 | <.1 | 6214 |
| JAN., 1975 | | | | | | | | | | | | |
| 03... | 2 | -- | -- | 907 | -- | 1.23 | .04 | .04 | 3.2 | .00 | .0 | 6214 |
| 15... | 1 | -- | -- | 878 | 34.8 | 1.19 | .05 | .05 | 3.4 | .03 | .0 | 6214 |
| FEB. | | | | | | | | | | | | |
| 03... | 1 | -- | -- | 944 | -- | 1.28 | -- | .05 | 3.0 | .03 | .1 | 6214 |

PROCESS DATE 03/75
09306039 - COTTONWOOD GUL NEAR RIO BLANCO. CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | TIME | TYPE | SAMPLE NUMBER (00008) | TEMPER-ATURE (DEG C) (00010) | INSTAN-TANEOUS DIS-CHARGE (CFS) (00061) | TUR-BID-ITY (JTU) (00070) | COLOR (PLAT-INUM-COBALT UNITS) (00080) | SPE-CIFIC CON-DUCT-ANCE (MICRO-MHOS) (00095) | PH (UNITS) (00400) | CARBON DIOXIDE (CO2) (MG/L) (00405) | ALKA-LINITY AS CACO3 (MG/L) (00410) | BICAR-BONATE (HCO3) (MG/L) (00440) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEC.. 1974 | | | | | | | | | | | | |
| 05... | 1045 | 2 | 751700 | 5.0 | .38 | 200 | 20 | 1220 | 8.5 | 2.5 | 402 | 449 |

PROCESS DATE 0[illegible]/75
DISTRICT CODE 08

09306039 - COTTONWOOD GULCH NEAR RIO BLANCO, CO.

WATER QUALITY DATA

| DATE | CAR-BONATE (CO3) (MG/L) (00445) | OIL AND GREASE (MG/L) (00550) | DIS-SOLVED AMMONIA NITRO-GEN (N) (MG/L) (00608) | DIS-SOLVED NITRITE (N) (MG/L) (00613) | DIS-SOLVED NITRATE (N) (MG/L) (00618) | TOTAL KJEL-DAHL NITRO-GEN (N) (MG/L) (00625) | DIS-SOLVED NITRITE PLUS NITRATE (N) (MG/L) (00631) | DIS-SOLVED ORTHO PHOS-PHATE (PO4) (MG/L) (00660) | TOTAL PHOS-PHORUS (P) (MG/L) (00665) | DIS-SOLVED ORTHO. PHOS-PHORUS (P) (MG/L) (00671) | CYANIDE (CN) (MG/L) (00720) | DIS-SOL-VED SUL-FIDE (S) (MG/L) (00746) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEC., 1974 | | | | | | | | | | | | |
| 05... | 20 | 0 | .18 | .01 | .22 | .50 | .23 | .06 | .98 | .02 | .00 | .2 |

09306039 - COTTONWOOD GUL[illegible] NEAR RIO BLANCO, CO.

PROCESS DATE [illegible]03/75
DISTRICT CODE 08

WATER QUALITY DATA

| DATE | HARD-NESS (CA,MG) (MG/L) (00900) | NON-CA-BONATE HARD-NESS (MG/L) (00902) | DIS-SOLVED CAL-CIUM (CA) (MG/L) (00915) | DIS-SOLVED MAG-NE-SIUM (MG) (MG/L) (00925) | DIS-SOLVED SODIUM (NA) (MG/L) (00930) | SODIUM AD-SORP-TION RATIO (00931) | PERCENT SODIUM (00932) | DIS-SOLVED PO-TAS-SIUM (K) (MG/L) (00935) | DIS-SOLVED CHLO-RIDE (CL) (MG/L) (00940) | DIS-SOLVED SULFATE (SO4) (MG/L) (00945) | DIS-SOLVED FLUO-RIDE (F) (MG/L) (00950) | DIS-SOLVED SILICA (SIO2) (MG/L) (00955) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEC.., 1974 | | | | | | | | | | | | |
| 05... | 270 | 0 | 50 | 34 | 200 | 5.3 | 62 | 1.3 | 30 | 230 | 5.2 | 17 |

09306039 - COTTONWOOD [illegible]LCH NEAR RIO BLANCO, CO.

WATER QUALITY DATA

| DATE | DIS-SOLVED ARSENIC (AS) (UG/L) (01000) | DIS-SOLVED BARIUM (BA) (UG/L) (01005) | DIS-SOLVED BERYL-LIUM (BE) (UG/L) (01010) | DIS-SOLVED BISMUTH (BI) (UG/L) (01015) | DIS-SOLVED BORON (B) (UG/L) (01020) | DIS-SOLVED CAD-MIUM (CD) (UG/L) (01025) | DIS-SOLVED CHRO-MIUM (CR) (UG/L) (01030) | DIS-SOLVED COBALT (CO) (UG/L) (01035) | DIS-SOLVED COPPER (CU) (UG/L) (01040) | DIS-SOLVED IRON (FE) (UG/L) (01046) | DIS-SOLVED LEAD (PB) (UG/L) (01049) | DIS-SOLVED MAN-GANESE (MN) (UG/L) (01056) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEC., 1974 | | | | | | | | | | | | |
| 05... | 7 | 180 | <2 | <6 | 150 | <20 | <6 | <6 | 3 | 140 | <5 | 5 |

PROCESS D 03/03/75
09306039 - COTTONWOOD LCH NEAR RIO BLANCO. CO. DISTRICT CODE 08

WATER QUALITY DATA

| DATE | DIS-SOLVED MOLYB-DENUM (MO) (UG/L) (01060) | DIS-SOLVED NICKEL (NI) (UG/L) (01065) | DIS-SOLVED SILVER (AG) (UG/L) (01075) | DIS-SOLVED STRON-TIUM (SR) (UG/L) (01080) | DIS-SOLVED VANA-DIUM (V) (UG/L) (01085) | DIS-SOLVED ZINC (ZN) (UG/L) (01090) | DIS-SOLVED TIN (SN) (UG/L) (01100) | DIS-SOLVED ALUM-INUM (AL) (UG/L) (01106) | DIS-SOLVED GALLIUM (GA) (UG/L) (01120) | DIS-SOLVED GER-MANIUM (GE) (UG/L) (01125) | DIS-SOLVED LITHIUM (LI) (UG/L) (01130) | DIS-SOLVED SELE-NIUM (SE) (UG/L) (01145) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DEC., 1974 | | | | | | | | | | | | |
| 05... | 10 | <4 | 0 | 3300 | <3.0 | <20 | <6 | 140 | <3 | <6 | 20 | 4 |

09306039 - COTTONWOOD GU[illegible] NEAR RIO BLANCO, CO.

WATER QUALITY DATA

| DATE | DIS-SOLVED TI-TANIUM (TI) (UG/L) (01150) | DIS-SOLVED ZIR-CONIUM (ZR) (UG/L) (01160) | DIS-SOLVED SOLIDS (SUM OF CONSTI-TUENTS) (MG/L) (70301) | DIS-SOLVED SOLIDS (TONS PER DAY) (70302) | DIS-SOLVED SOLIDS (TONS PER AC-FT) (70303) | TOTAL ORTHO PHOS-PHORUS (P) (MG/L) (70507) | DIS_ SOLVED AMMONIA (NH4) (MG/L) (71846) | DIS_ SOLVED NITRATE (NO3) (MG/L) (71851) | DIS_ SOLVED NITRITE (NO2) (MG/L) (71856) | DIS-SOLVED MERCURY (HG) (UG/L) (71890) | ELEV. OF LAND SURFACE DATUM (FT. ABOVE MSL) (72000) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DEC., 1974 | | | | | | | | | | | |
| 03... | 6 | <11 | 814 | .84 | 1.11 | .80 | .23 | .97 | .03 | <.1 | 6353 |

Springs and Seeps

## II A-2 SPRINGS AND SEEPS

Water quality samples from all springs and seeps adjacent to Tract C-b were collected and analyzed during the first quarterly report period, and the analytical data were included in the first report.

The ground temperatures were generally cold throughout the second quarterly period, with the result that many of the seepage areas were covered by snow or were frozen. It is planned that at least one additional water quality sampling run on springs and seeps will be conducted in April or May; results from that sampling run will be included in a subsequent quarterly report.

CORE DRILLING AND
ASSOCIATED GROUND WATER

## II B CORE DRILLING AND ASSOCIATED GROUND WATER

The following Well Summary Table is similar in content to the summary presented in Quarterly Report #1. However, it has been revised to reflect activities completed or additional data received in the second quarter.

ell Since Plots

## QUARTERLY REPORT #2
## Well Summary Table

| 1. Well Designation | AT-1 | AT-1a | AT-1a | AT-1b | AT-1c | AT-1d | SG-1 | SG-1a | SG-6 | SG-8 | SG-9 | SG-10 | SG-10a | SG-11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| . Well Type | AT | AT<br>CH | AT | AT | AT | AT | CH | GHT | AT<br>CH | CH | CH | AT<br>CH | GHT | AT<br>CH |
| 3. Drilling Completion Date | 1/23<br>75 | 7/1<br>74 | 7/10<br>74 | 7/20<br>74 | 8/18<br>74 | 7/28<br>74 | 12/6<br>74 | 2/7<br>75 | 8/22<br>74 | 11/27<br>74 | 10/23<br>74 | 6/29<br>74 | 7/10<br>74 | 9/8<br>74 |
| 4. Total Depth (Feet) | 1338 | 1621 | 1341 | 1638 | 1640 | 1640 | 2525 | 1180 | 2220 | 2608 | 2750 | 2211 | 1333 | 2826 |
| 5. Water Data | | | | | | | | | | | | | | |
| a. Drilling Water Production | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q | | | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q |
| b. Drilling Water Samples (Number) | 1 | 4 | NA | NA | 4 | NA | 7 | | 5 | | 5 | 4 | NA | 25 |
| c. Water Quality Analyses | C1Q | C1Q | | | C1Q | | C2Q | | C1Q | | C1Q | C1Q | | C1Q |
| 6. Aquifer Data | | | | | | | | | | | | | | |
| a. Drill Stem Tests | | C1Q | | | C1Q | | | | | | | C1Q | | |
| b. Jetting Tests | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q | C2Q | | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q |
| 7. Geophysical Logs, Schlumberger | | | | | Inc. | | | | Inc. | | | | | |
| a. Borehole, Compensated Sonic | C1Q | | | C1Q | | C1Q | C2Q | | | C2Q | C2Q | | | C1Q |
| b. Laterolog | C1Q | | | C1Q | | C1Q | C2Q | | | C2Q | C2Q | | | C1Q |
| c. Formation Density | C1Q | | | C1Q | | C1Q | C2Q | C2Q | | C2Q | C2Q | | | |
| d. Nuclear Formation Density | | | | C1Q | | C1Q | | | | | | | | |
| e. Temperature | C1Q | C1Q | | C1Q | | C1Q | C2Q | | | C2Q | C2Q | C1Q | | C1Q |
| f. Cement Bond Log | | | | | | Inc. | | | | | | | | Inc. |
| 8. Geophysical Logs, Birdwell | | | | | | | | | | | | | | |
| a. Velocity, 3-dimensional | | C1Q | | | | | | | | | | C1Q | | |
| b. Electric | | C1Q | | | | | | | | | | C1Q | | |
| c. Density | | C1Q | | | | | | | | | | C1Q | | |
| d. Nuclear | | C1Q | | | | | | | | | | C1Q | | |
| e. Caliper | | C1Q | | | | | | | | | | C1Q | | |
| f. Temperature | | C1Q | | | | | | | | | | C1Q | | |
| 9. Geophysical Logs, Other | | | | | | | | | | | | | | |
| a. Welex, Micro-seismogram | | Inc. | | | | | | | | | | Inc. | | |
| b. McCullough, Temperature | | | | Inc. | | | | | | | | | | |
| 10. Field Lithologic Log | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q | C2Q | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q |
| 11. Cored Interval (Feet From Surface) | | | | | | | | | | | | | | |
| a. Top | NA | 1270 | NA | NA | NA | NA | 550 | | 1195 | 580 | 1200 | 1200 | NA | 750 |
| b. Bottom | NA | 1519 | NA | NA | NA | NA | 2525 | | 2220 | 2608 | 2750 | 2211 | NA | 2810 |
| 12. Assay Data | | | | | | | | | | | | | | |
| a. Fischer Assay | NA | C1Q | NA | NA | NA | NA | | | | | C2Q | C1Q | NA | C1Q |
| b. Soluble Sodium | NA | C1Q | NA | NA | NA | NA | | | | | C2Q | C1Q | NA | |
| c. Alumina | NA | C1Q | NA | NA | NA | NA | | | | | C2Q | C1Q | NA | |
| 13. Trace Element Analysis | | | C2Q | | | | | | | C2Q | C2Q | C2Q | | |
| 14. Rock Mechanics Data | | C1Q | | | | | | | | | | | | |
| 15. Gas Data | | | | | | | | | | | | | | |
| a. Drilling Log | NA | NA | NA | NA | | NA | C1Q | | C1Q | C1Q | C1Q | | NA | C1Q |
| b. Bomb Samples (Number Taken) | NA | NA | NA | NA | 2 | NA | 8 | | 4 | 11 | 8 | | NA | 6 |
| c. Bomb Analyses | NA | NA | NA | NA | C2Q | NA | C1Q2Q | | C1Q | C1Q2Q | C1Q | | | C1Q |
| . Completion Data | C2Q | C1Q | C1Q | C1Q | C1Q | C1Q | C2Q | C2Q | C1Q | C2Q | C1Q | C1Q | C1Q | C1Q |
| 17. Survey Plat | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q | | C1Q | C1Q | C1Q | C1Q | | C1Q |

KEY: NA = Not Applicable
Inc. = Incomplete
C1Q = Complete, First Quarterly Report
C2Q = Complete, Second Quarterly Report

AT = Aquifer Test Well
AW = Alluvial Well
CH = Standard Core Hole
GHT = Ground Water/Hydrologic Test Well
AB = Abandoned

QUARTERLY REPORT #2
Well Summary Table (Continued)

| 1. Well Designation | SG-17 | SG-18 | SG-18a | SG-19 | SG-20 | SG-21 | Cb-1 | Cb-2 | Cb-2b | Cb-3 | Cb-4 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well Type | CH | AB | GHT | CH<br>GHT | GHT | GHT | GHT | GHT | AB | GHT | GHT | | | |
| Drilling Completion Date | 1/13<br>75 | 10/13<br>74 | 10/18<br>74 | 9/28<br>74 | 12/13<br>74 | 1/8<br>75 | OLD | OLD | 9/20<br>74 | OLD | OLD | | | |
| 4. Total Depth (Feet) | 2460 | 1426 | 1330 | 980 | 981 | 1036 | 2103 | 1469 | 1220 | | 1470 | | | |
| 5. Water Data | | | | | | | | | | | | | | |
| a. Drilling Water Production | | C1Q | C1Q | C1Q | | | NA | NA | C1Q | NA | NA | | | |
| b. Drilling Water Samples (Number) | 31 | 3 | 1 | 4 | 5 | 5 | | | | | | | | |
| c. Water Quality Analyses | C2Q | C1Q | C1Q | C1Q | C2Q | C2Q | | | | | | | | |
| 6. Aquifer Data | | | | | | | | | | | | | | |
| a. Drill Stem Tests | C2Q | | | | C2Q | C2Q | NA | NA | | NA | NA | | | |
| b. Jetting Tests | | C1Q | C1Q | C1Q | C2Q | C2Q | NA | NA | C1Q | NA | NA | | | |
| 7. Geophysical Logs, Schlumberger | | | | | | | | | | | | | | |
| a. Borehole, Compensated Sonic | C2Q | C1Q | | C1Q | C2Q | C2Q | | | | | | | | |
| b. Laterolog | C2Q | C1Q | | C1Q | | C2Q | | | | | | | | |
| c. Formation Density | C2Q | C1Q | | C1Q | C2Q | C2Q | | | | | | | | |
| d. Nuclear Formation Density | | | | | | | | | | | | | | |
| e. Temperature | C2Q | C1Q | | C1Q | C2Q | C2Q | | | | | | | | |
| f. Cement Bond Log | | | | | | | | Inc. | | | Inc. | | | |
| 8. Geophysical Logs, Birdwell | | | | | | | | | | | | | | |
| a. Velocity, 3-dimensional | | | | | | | | | | | | | | |
| b. Electric | | | | | | | | | | | | | | |
| c. Density | | | | | | | | | | | | | | |
| d. Nuclear | | | | | | | | | | | | | | |
| e. Caliper | | | | | | | | | | | | | | |
| f. Temperature | | | | | | | C1Q | C1Q | | C1Q | C1Q | | | |
| 9. Geophysical Logs, Other | | | | | | | | | | | | | | |
| a. Welex, Micro-seismogram | | | | | | | | | | | | | | |
| b. McCullough, Temperature | | | | | | | | | | | | | | |
| 10. Field Lithologic Log | C2Q | C1Q | C1Q | C1Q | C2Q | C2Q | NA | NA | C1Q | NA | NA | | | |
| 11. Cored Interval (Feet From Surface) | | | | | | | | | | | | | | |
| a. Top | | 1380 | NA | 930 | | | NA | NA | NA | NA | NA | | | |
| b. Bottom | | 1426 | NA | 980 | | | NA | NA | NA | NA | NA | | | |
| 12. Assay Data | | | | | | | | | | | | | | |
| a. Fischer Assay | | C1Q | NA | C1Q | | | NA | NA | NA | NA | NA | | | |
| b. Soluble Sodium | | | | | | | NA | NA | NA | NA | NA | | | |
| c. Alumina | | | | | | | NA | NA | NA | NA | NA | | | |
| 13. Trace Element Analysis | | | | | | | | | | | | | | |
| 14. Rock Mechanics Data | | | | | | | NA | NA | NA | NA | NA | | | |
| 15. Gas Data | | | | | | | | | | | | | | |
| a. Drilling Log | C2Q | C1Q | C1Q | C1Q | C2Q | - | NA | NA | C1Q | NA | NA | | | |
| b. Bomb Samples (Number Taken) | 31 | 1 | 1 | 4 | 5 | 4 | NA | NA | 1 | NA | NA | | | |
| c. Bomb Analyses | C1Q2Q | C1Q | C1Q | C1Q | C2Q | C2Q | NA | NA | C1Q | NA | NA | | | |
| Completion Data | C2Q | C1Q | C1Q | C1Q | C2Q | C2Q | C1Q | C2Q | C1Q | C1Q | C1Q | | | |
| 17. Survey Plat | C1Q | C1Q | | C1Q | C1Q | C1Q | C1Q | C1Q | | C1Q | C1Q | | | |

KEY: NA = Not Applicable
Inc. = Incomplete
C1Q = Complete, First Quarterly Report
C2Q = Complete, Second Quarterly Report

AT = Aquifer Test Well
AW = Alluvial Well
CH = Standard Core Hole
GHT = Ground Water/Hydrologic Test Well
AB = Abandoned

QUARTERLY REPORT #2
Well Summary Table (Continued)

| 1. Well Designation | A-1 | A-2 | A-3 | A-4 | A-5 | A-6 | A-7 | A-8 | A-9 | A-10 | A-11 | A-12 | A-13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2. Well Type | AW | AW | AW | AW | AW | AW | AW | AW | AW | AW | AW | AW | AW |
| 3. Drilling Completion Date | 10/2 74 | 10/4 74 | 10/7 74 | 10/8 74 | 10/3 74 | 10/10 74 | 9/28 74 | 10/1 74 | 9/23 74 | 9/23 74 | 9/24 74 | 9/24 74 | 10/8 74 |
| 4. Total Depth | 109 | 82 | 112 | 64 | 86 | 60 | 51 | 70 | 57 | 67 | 66 | 81 | 14 |
| 5. Water Data | | | | | | | | | | | | | |
| a. Drilling Water Production | | | | | | | | | | | | | |
| b. Drilling Water Samples (Number) | | | | | | | | | | | | | |
| c. Water Quality Analyses | C1Q | C1Q | C1Q | NA | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q | NA |
| 6. Aquifer Data | | | | | | | | | | | | | |
| a. Drill Stem Tests | | | | | | | | | | | | | |
| b. Jetting Tests | | | | | | | | | | | | | |
| 7. Geophysical Logs, Schlumberger | | | | | | | | | | | | | |
| a. Borehole, Compensated Sonic | | | | | | | | | | | | | |
| b. Laterolog | | | | | | | | | | | | | |
| c. Formation Density | | | | | | | | | | | | | |
| d. Nuclear Formation Density | | | | | | | | | | | | | |
| e. Temperature | | | | | | | | | | | | | |
| f. Cement Bond Log | | | | | | | | | | | | | |
| 8. Geophysical Logs, Birdwell | | | | | | | | | | | | | |
| a. Velocity, 3-dimensional | | | | | | | | | | | | | |
| b. Electric | | | | | | | | | | | | | |
| c. Density | | | | | | | | | | | | | |
| d. Nuclear | | | | | | | | | | | | | |
| e. Caliper | | | | | | | | | | | | | |
| f. Temperature | | | | | | | | | | | | | |
| 9. Geophysical Logs, Other | | | | | | | | | | | | | |
| a. Welex, Micro-seismogram | | | | | | | | | | | | | |
| b. McCullough, Temperature | | | | | | | | | | | | | |
| 10. Field Lithologic Log | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q | C2Q | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q |
| 11. Cored Interval (Feet From Surface) | | | | | | | | | | | | | |
| a. Top | | | | | | | | | | | | | |
| b. Bottom | | | | | | | | | | | | | |
| 12. Assay Data | | | | | | | | | | | | | |
| a. Fischer Assay | | | | | | | | | | | | | |
| b. Soluble Sodium | | | | | | | | | | | | | |
| c. Alumina | | | | | | | | | | | | | |
| 13. Trace Element Analysis | | | | | | | | | | | | | |
| 14. Rock Mechanics Data | | | | | | | | | | | | | |
| 15. Gas Data | | | | | | | | | | | | | |
| a. Drilling Log | | | | | | | | | | | | | |
| b. Bomb Samples (Number Taken) | | | | | | | | | | | | | |
| c. Bomb Analyses | | | | | | | | | | | | | |
| 6. Completion Data | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q |
| . Survey Plat | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q | C1Q |

KEY: NA = Not Applicable
Inc. = Incomplete
C1Q = Complete, First Quarterly Report
C2Q = Complete, Second Quarterly Report

AT = Aquifer Test Well
AW = Alluvial Well
CH = Standard Core Hole
GHT = Ground Water/Hydrologic Test Well
AB = Abandoned

Emission Data

# II B-2 COMPLETION DATA

Included in this section of Quarterly Report #2 are well completion drawings for:

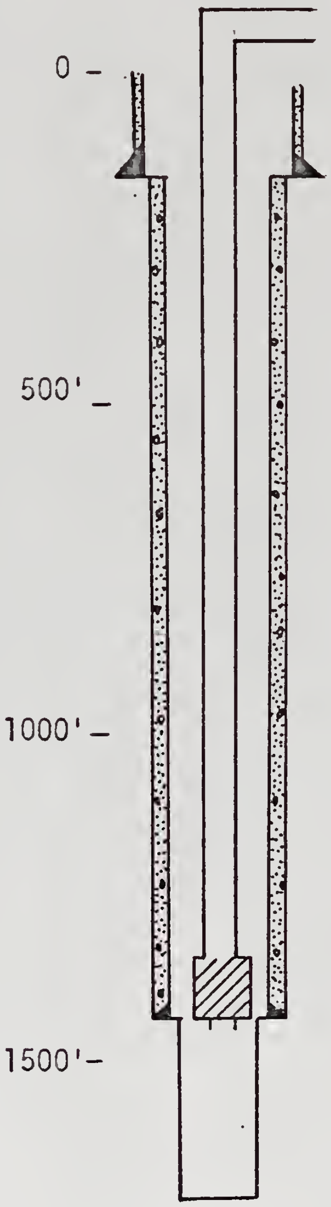
AT-1
Cb-2
SG-1
SG-1a
SG-8
SG-17
SG-20
SG-21

Some of the tubing strings had not been perforated at the close of the second quarter.

AT-1

C-b Tract

Section 7, 3S, 96W



13 3/8" at 156' Cemented to Surface

8 5/8" at 1430' Cemented w/825sx
Top Cement at 375'

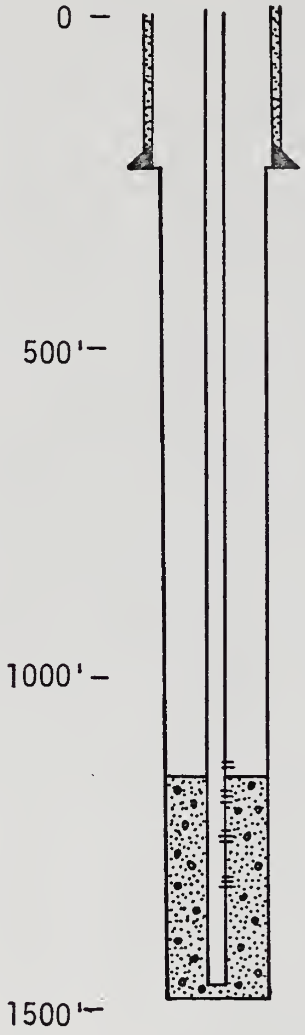
Set Pump at 1430' on 4½" tubing

7 7/8" Hole to 1700' T. D.

Cb-2

C-b Tract

Section 6, 3S, 96W



(See Prior Completion Data Sheet)

2 3/8" Tubing to 1460' w/50sx

Original Total Depth 1482'

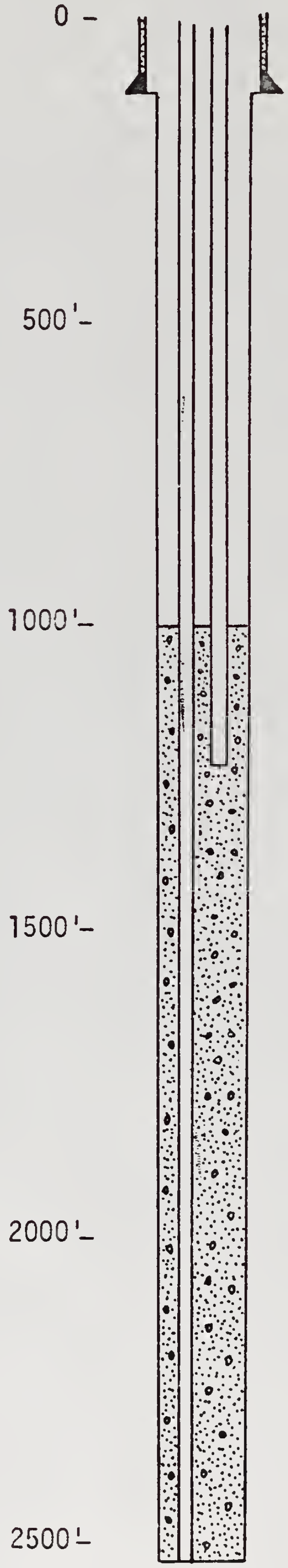
Cement Top by Log at 1146'

Perforations 1126 to 1320' w/1 shot/foot

## SG - 1

C-b Tract

Section 2, 3S, 97W



8 5/8" at 151' Cemented to Surface

#1 String to 2519' PBTD__________?

#2 String to 1234'

Cemented 2-7-75 w/385sx

Recemented 3-15-75 w/100 sx, 4% gel, 10#/sx Calseal, 2% Calcium Chloride

Top of Cement by Log at 900' ±

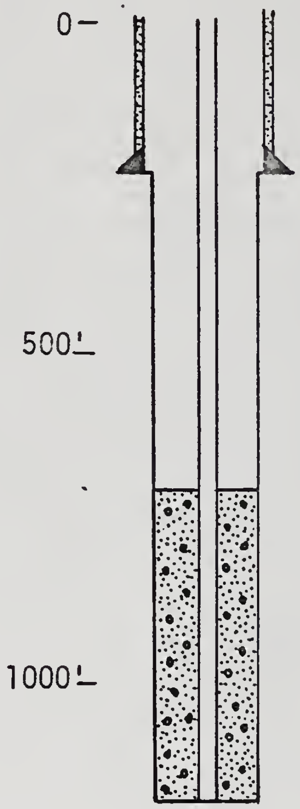
Perforations -- Not Perforated as of 3-15-75

6 3/4" Hole to 2525' Total Depth

# SG - 1A

C-b Tract

Section 2, 3S, 97W



7" at 230' Cemented to Surface

Cemented 2-7-75 2 3/8" Tubing at 700' ± to 1180' w/125sx

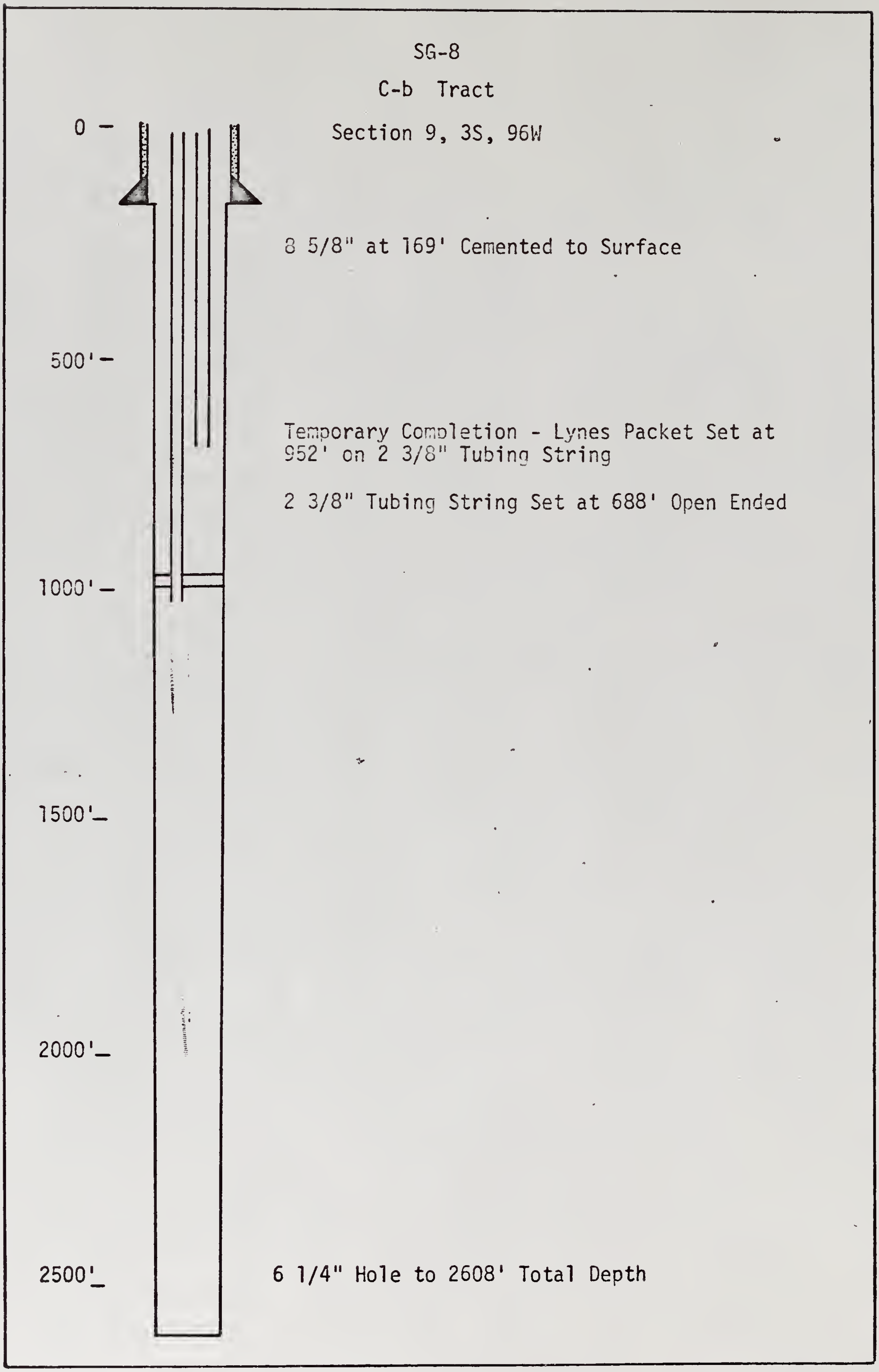
700' ± Cemented

6 1/4" Hole to 1180' Total Depth

SG-8

C-b Tract

Section 9, 3S, 96W


0
500'
1000'
1500'
2000'
2500'

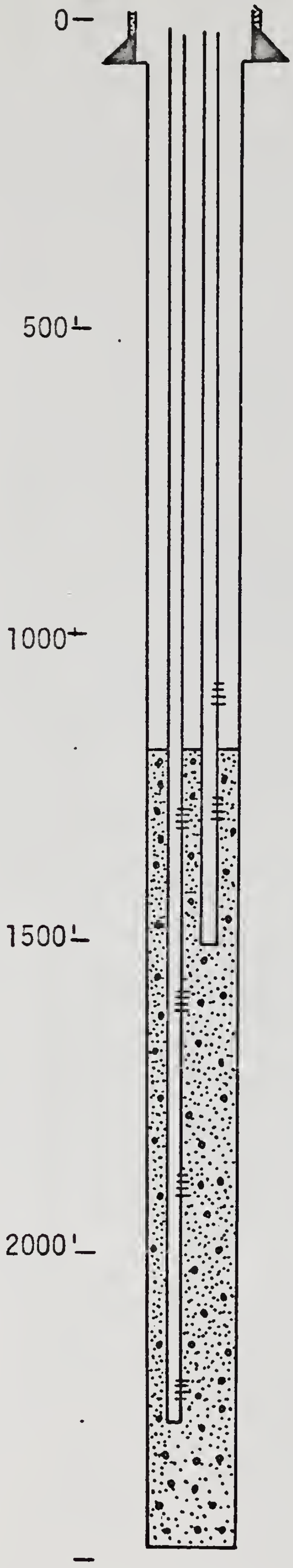
8 5/8" at 169' Cemented to Surface

Temporary Completion - Lynes Packet Set at 952' on 2 3/8" Tubing String

2 3/8" Tubing String Set at 688' Open Ended

6 1/4" Hole to 2608' Total Depth

SG - 17
C-b Tract
Section 16, 3S, 96W



8 5/8" at 63' Cemented to Surface

#1 String to 2335' PBTD 2277

#2 String to 1490'

Cemented 330 sx w/Howco Thixotropic Cement

Top Cement by Log at 1185'

Perforations:
#1 String 1292-2254' w/1 shot/foot

#2 String 1088-1228' w/1 shot/foot

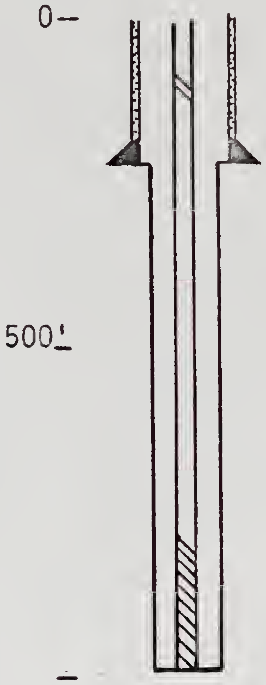
Spotted 25 sx Cement 2355-2460'

6 3/4" Hole to 2460' Total Depth

## SG - 20

C-b Tract

Section 31, 2S, 96W



7" at 212' Cemented to Surface

4" at 986' Total Depth; Bottom 200 feet slotted.

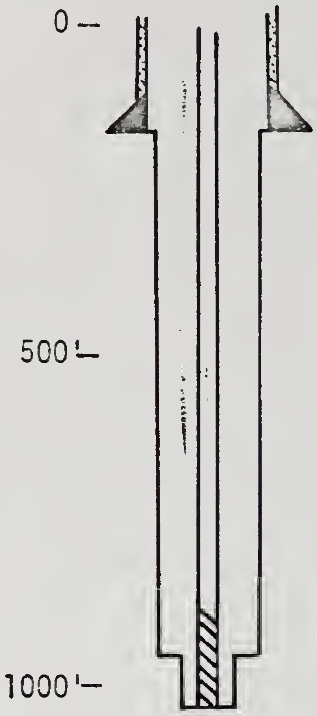
4" slotted from 100-110'

6¼" hole to 987' Total Depth

## SG - 21

C-b Tract

Section 13, 3S, 97W



8 5/8" at 156' Cemented to Surface

4" at 1035' Total Depth; Bottom 150' slotted

7 7/8" Hole to 960'

6 3/4" Hole to 1036' Total Depth

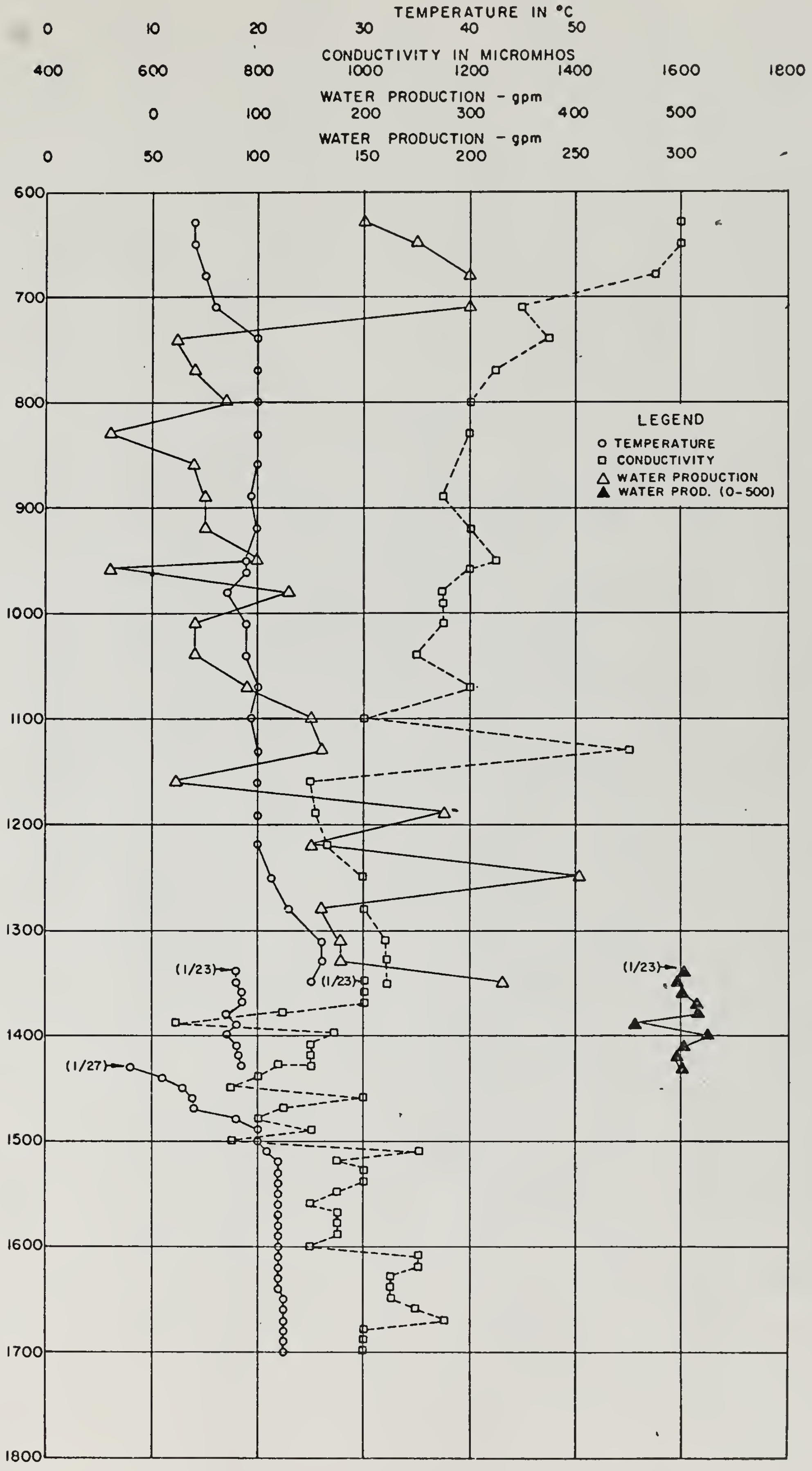
Drilling Water Production

## II B-3 DRILLING WATER PRODUCTION DATA

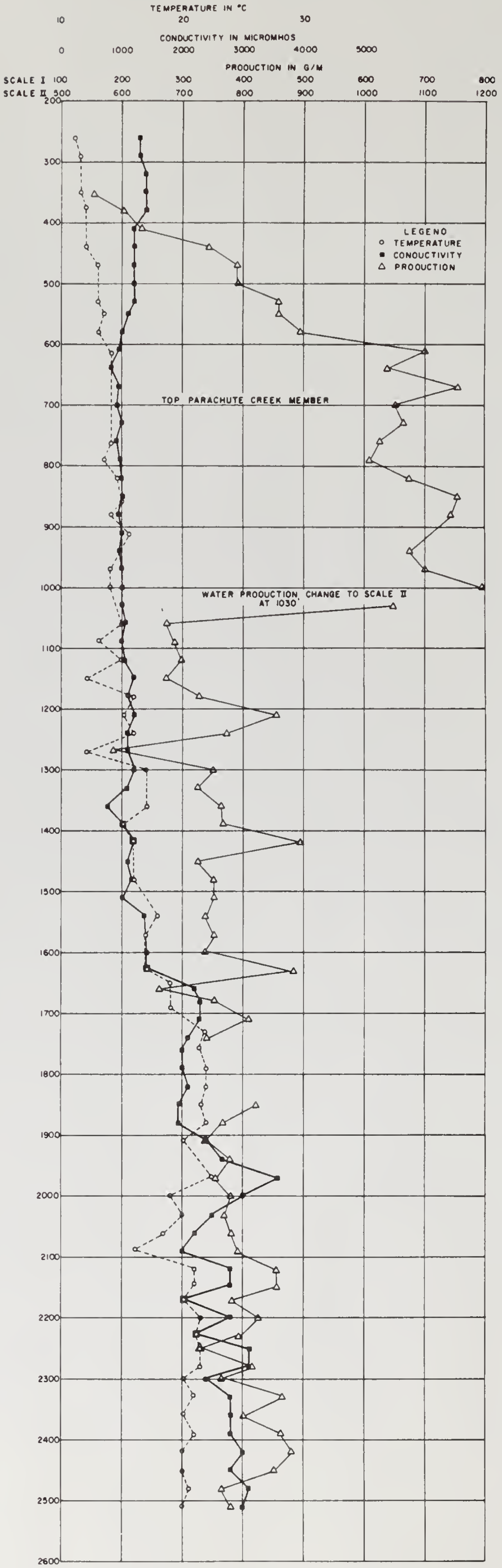
During the drilling of wells and coreholes on and adjacent to Tract C-b, records were kept of drilling water production data. The records included produced water temperature and specific conductivity as well as produced and injected water volumes. Such readings were taken at approximately 30 foot intervals. These data are included in raw form in this section of the report.

Production data for wells AT-1, SG-1, SG-1A, SG-17, SG-20 and SG-21 were accumulated during the second quarter.

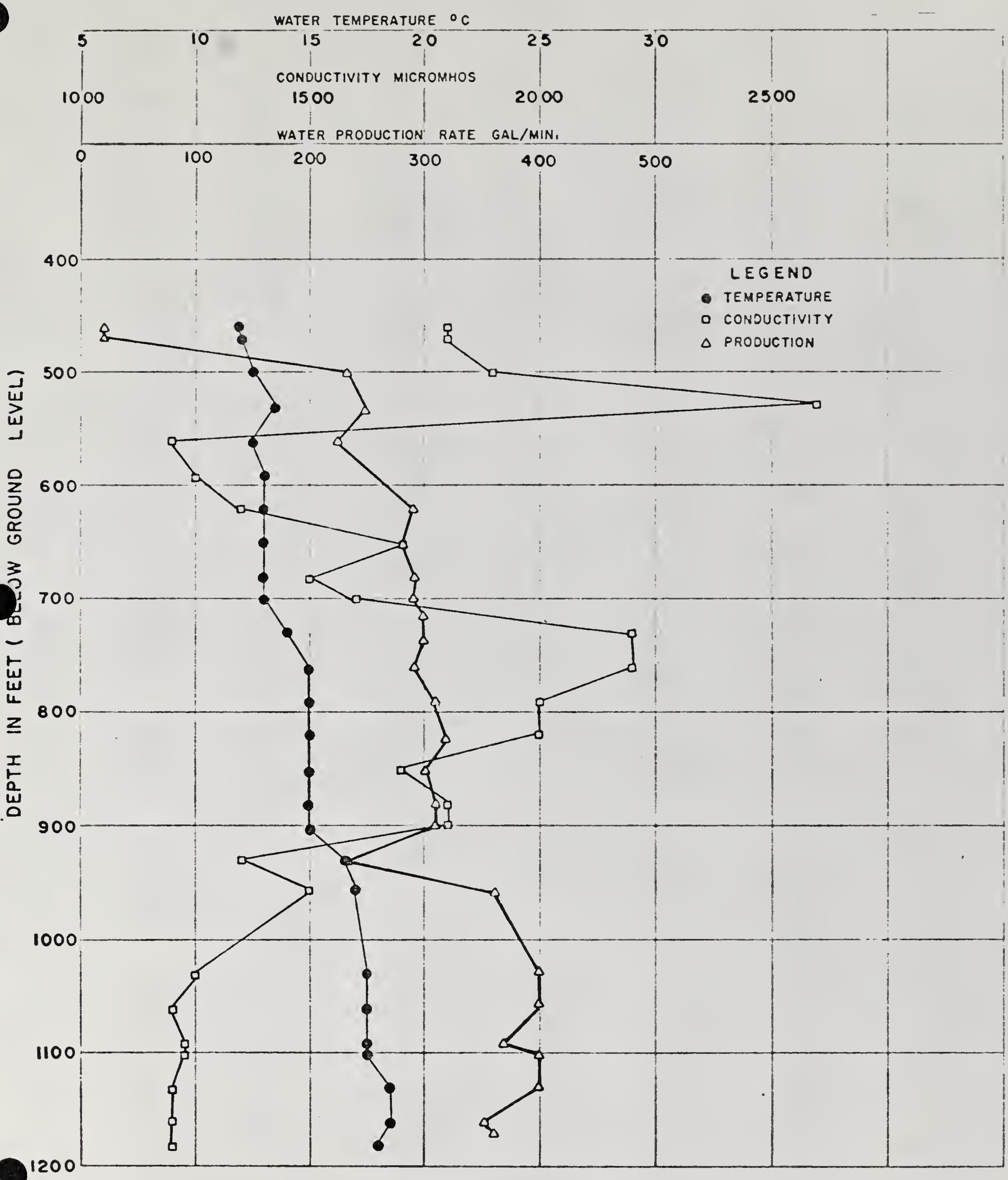
DEPTH vs TEMPERATURE, CONDUCTIVITY & WATER PRODUCTION AT-1



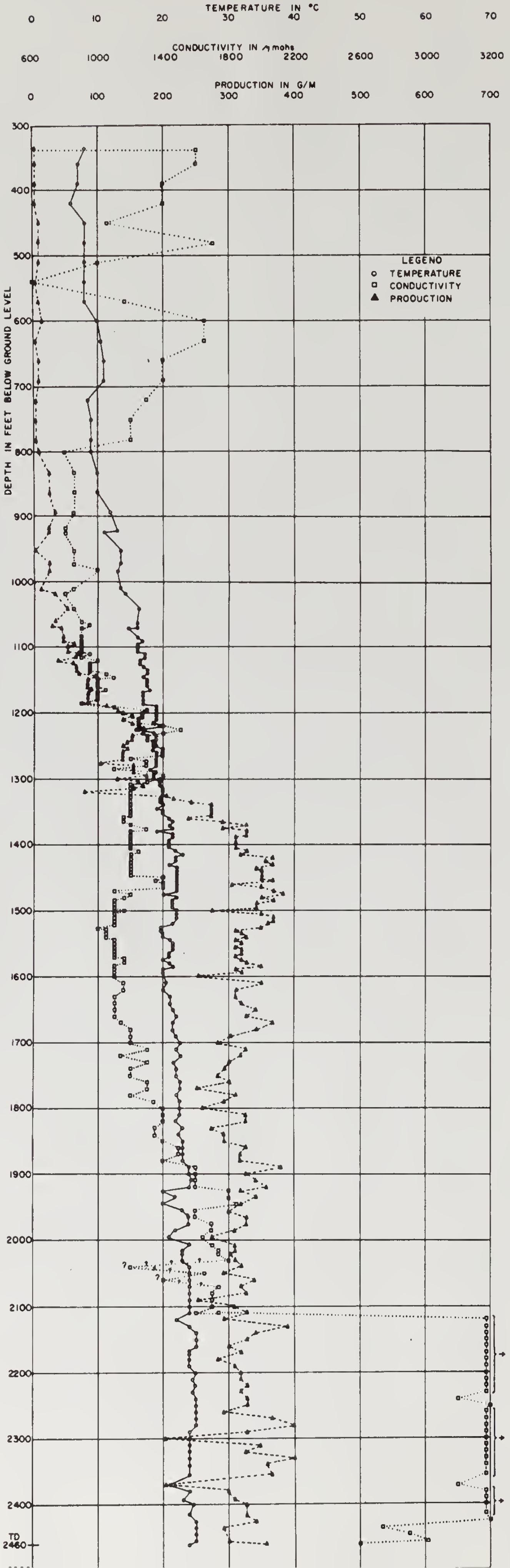
TEMPERATURE, PRODUCTION AND CONDUCTIVITY GRAPH SG-1



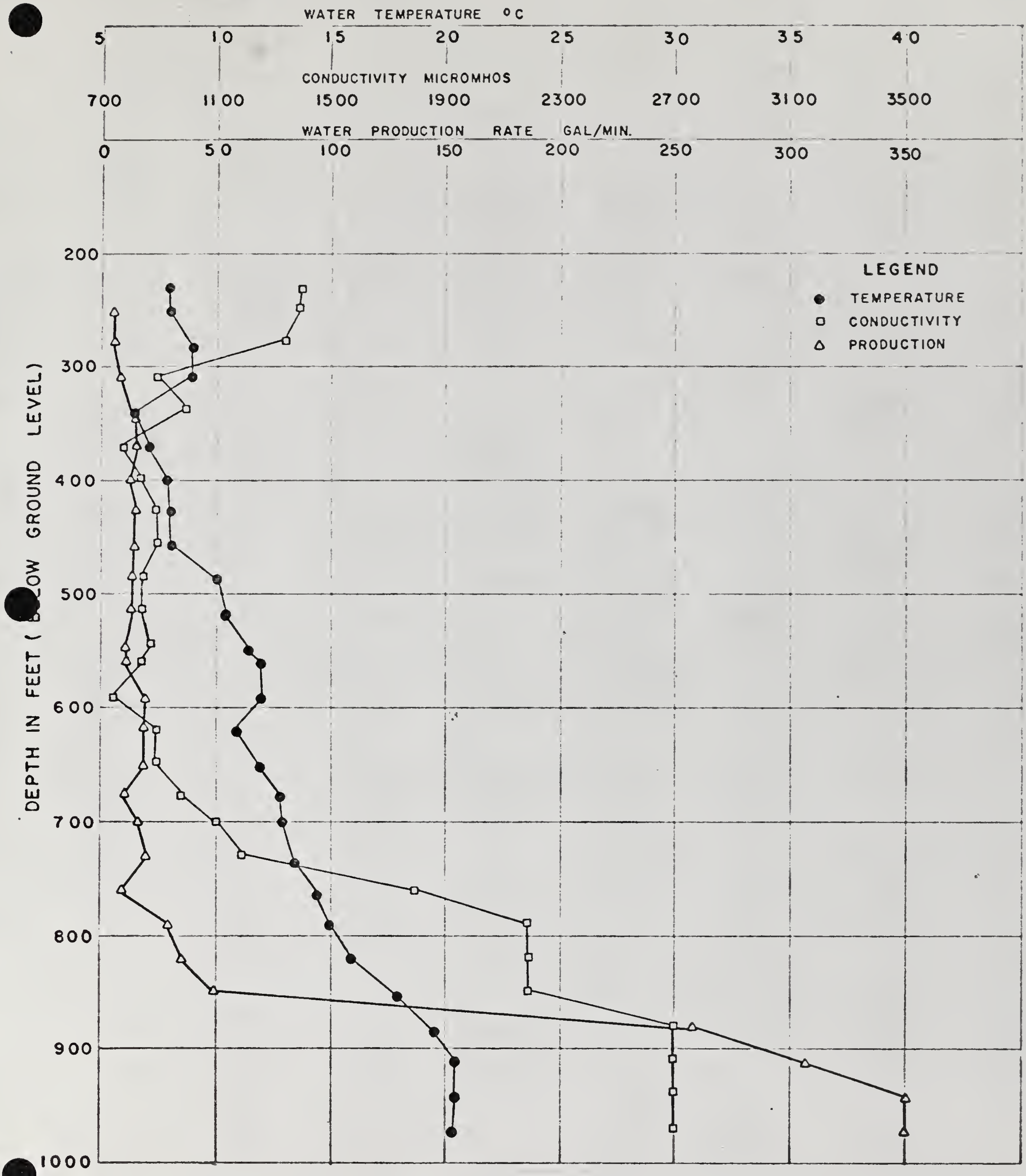
## TEMPERATURE, CONDUCTIVITY & PRODUCTION SG-1A



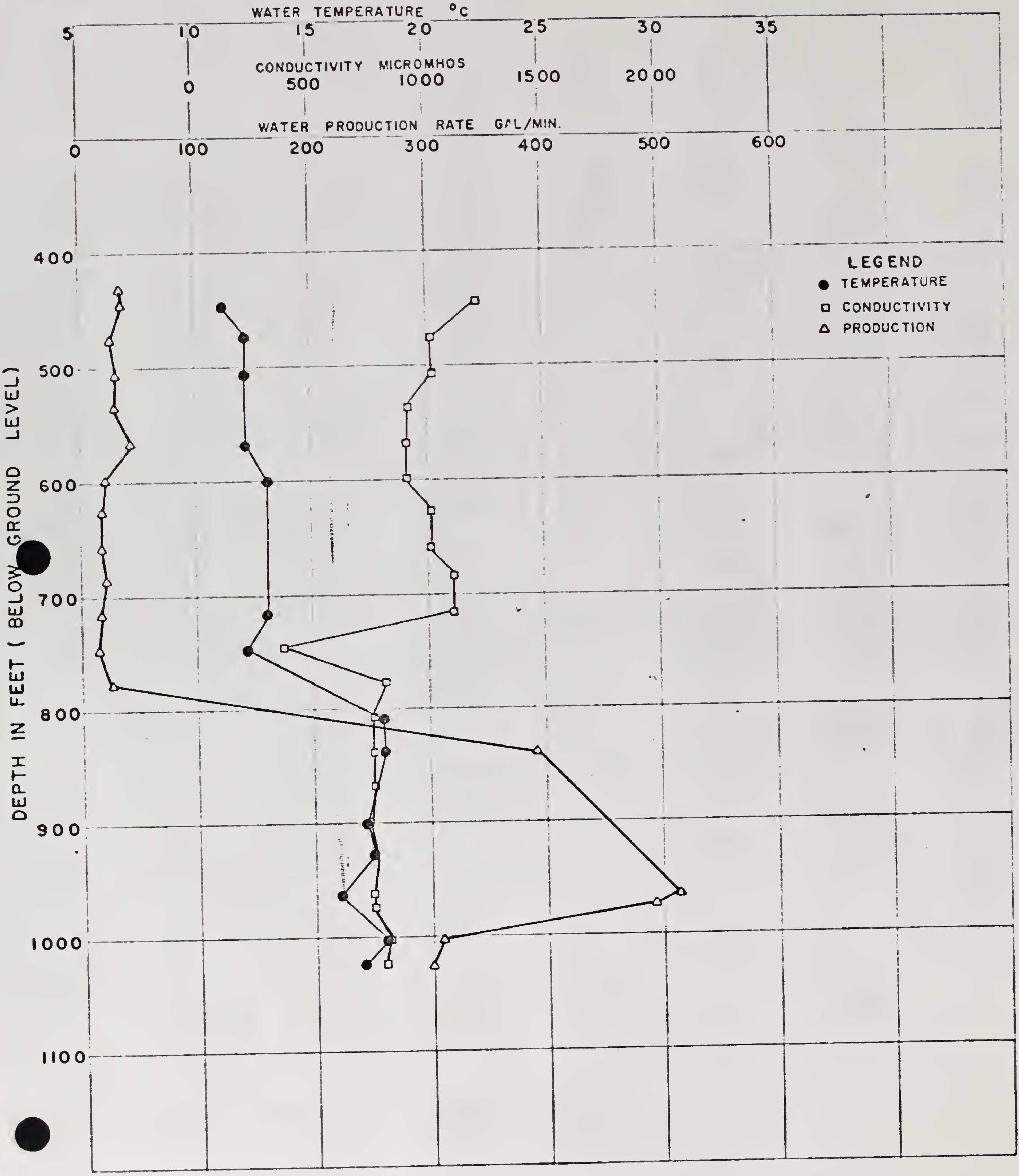
TEMPERATURE, PRODUCTION AND CONDUCTIVITY GRAPH SG-17



## TEMPERATURE, CONDUCTIVITY & PRODUCTION SG-20



TEMPERATURE, CONDUCTIVITY & PRODUCTION SG-21



## WATER PRODUCTION AND CONDUCTIVITY DATA SHEET

194[illegible] FEL
1314 FSL

OPERATOR ARCO WELL NAME & NUMBER SORGHUM GULCH #1 LOCATION 2-3S-97W

| DATE | TIME | DEPTH | WATER TEMPERATURE | CONDUCTIVITY MICROMHOS | INJECTED WATER (rate - glm) | FLUME SIZE | FLUME READING | PRODUCTION RATE (gpm) | AIR PRESS REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 11-3 | 2435 | 260 | 11.0°C | 1300 | 10 gpm | 6" | — | | 75 lbs |
| 11-3 | 235 | 290 | 11.5 | 1300 | | | — | | 75 |
| 11-3 | 430 | 320 | 11.5 | 1400 | | | — | | 75 |
| 11-3 | 518 | 350 | 11.5 | 1400 | | | .32 | 153 | 125 |
| 11-3 | 609 | 380 | 12.0 | 1400 | | | .38 | 202 | 125 |
| 11-3 | 652 | 410 | 12.0 | 1200 | | | .42 | 233 | 125 |
| 11-3 | 725 | 440 | 12.0 | 1200 | | | .53 | 241 | 125 |
| 11-3 | 855 | 470 | 13.0 | 1200 | | | .58 | 390 | 210 |
| 11-3 | 1020 | 500 | 13.0 | 1200 | | | .58 | 390 | 210 |
| 11-3 | 1110 | 530 | 13.0 | 1200 | | | .64 | 458 | 200 |
| 11-3 | 1205 | 550 | 13.5 | 1100 | | | .64 | 458 | 200 |
| 11-4 | 340 | 580 | 13.0 | 1000 | | | .67 | 494 | 210 |
| 11-4 | 1630 | 610 | 14.0 | 950 | | | .84 | 700 | 325 |
| 11-6 | 0100 | 640 | 14.0 | 800 | | | .79 | 637 | 250 |
| 11-6 | 1720 | 670 | 14.0 | 950 | | | .88 | 754 | 300 |
| 11-6 | 2304 | 700 | 14.0 | 900 | ↓ | | .80 | 651 | 225 |
| 11-7 | 1430 | 730 | 14.0 | 950 | 12 gpm | | .81 | 664 | 300 |
| 11-7 | 2300 | 760 | 14.0 | 900 | | | .78 | 625 | 225 |
| 11-8 | 800 | 790 | 13.5 | 950 | | | .77 | 610 | 275 |
| 11-8 | 1910 | 820 | 14.5 | 980 | ↓ | ↓ | .82 | 673 | 400 |

# WATER PRODUCTION AND CONDUCTIVITY DATA SHEET

OPERATOR ARCO WELL NAME & NUMBER SORGHUM GULCH #1 LOCATION ____________

| DATE | TIME | DEPTH | WATER TEMPERATURE | CONDUCTIVITY MICROMHOS | INJECTED WATER (rate - glm) | FLUME SIZE | FLUME READING | PRODUCTION RATE (gpm) | AIR PRESSURE REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 11-9 | 35 | 850 | 15.0°C | 1000 | 10 | 6 | .88 | 754 | 300 |
| 11-9 | 1510 | 880 | 14. | 930 | | | .87 | 740 | 300 |
| 11-10 | 920 | 910 | 15.5 | 1000 | | | .85 | 714 | 400 |
| 11-10 | 1745 | 940 | 15. | 1000 | | | .82 | 673 | 400 |
| 11-11 | 635 | 970 | 14. | 1000 | | | .84 | 700 | 400 |
| 11-12 | 335 | 1000 | 14. | 1000 | | | .91 | 794 | 400 |
| 11-12 | 945 | 1030 | 14.5 | 1000 | 12 | | 1.11 | 1046 | 425 |
| 11-13 | 1615 | 1060 | 15. | 1050 | | | .82 | 673 | 400 |
| 11-14 | 150 | 1090 | 13. | 1000 | | | .83 | 687 | 500 |
| 11-14 | 1850 | 1120 | 15. | 1050 | | | .84 | 700 | 450 |
| 11-15 | 637 | 1150 | 12. | 1200 | | | .82 | 673 | 450 |
| 11-15 | 1230 | 1180 | 16. | 1100 | | | .86 | 727 | 400 |
| 11-16 | 645 | 1210 | 15. | 1200 | | | .95 | 853 | 400 |
| 11-16 | 1605 | 1240 | 16. | 1100 | | | .90 | 771 | 400 |
| 11-17 | 1200 | 1270 | 12. | 1100 | | | .75 | 588 | 400 |
| 11-17 | 1300 | 1300 | 17. | 1200 | | | .88 | 754 | 325 |
| 11-17 | 535 | 1330 | 17. | 1080 | | | .86 | 727 | 420 |
| 11-18 | 2410 | 1360 | 17. | 850 | | | .89 | 768 | 600 |
| 11-18 | 730 | 1390 | 15. | 1020 | | | .89 | 767 | 600 |
| 11-19 | 1935 | 1420 | 16. | 1200 | | | .98 | 898 | 600 |

# WATER PRODUCTION AND CONDUCTIVITY DATA SHEET

OPERATOR ARCO WELL NAME & NUMBER SG #1 LOCATION ____

| DATE | TIME | DEPTH | WATER TEMPERATURE | CONDUCTIVITY MICROMHOS | INJECTED WATER (rate - glm) | FLUME SIZE | FLUME READING | PRODUCTION RATE (gpm) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 11-20 | 0625 | 1450 | 16 | 1100 | 12 | 6" | .86 | 727 | 600 |
| 11-20 | 1415 | 1480 | 16 | 1150 | 12 |  | .98 | 754 | 600 |
| 11-20 | 230 | 1510 | 17 | 1080 | 12 |  | .89 | 754 | 600 |
| 11-21 | 1245 | 1540 | 18 | 1340 | 9.16 |  | .87 | 740 | 400 |
| 11-21 | 1850 | 1570 | 17 | 1400 | 9.16 |  | .88 | 753 | 400 |
| 11-22 | 0325 | 1600 | 17 | 1400 | 9 |  | .87 | 740 | 400 |
| 11-22 | 1620 | 1630 | 17 | 1400 | 9 |  | .97 | 884 | 650 |
| 11-23 | 0645 | 1660 | 19 | 2200 | 9 |  | .81 | 664 | 900 |
| 11-23 | 1315 | 1680 | 19 | 2300 | 9 |  | .88 | 754 | 600 |
| 11-23 | 1645 | 1700 | 19.5 | 2300 | 9 |  | .92 | 812 | 600 |
| 11-24 | 735 | 1730 | 22 | 2100 | 9 |  | .87 | 740 | 650 |
| 11-24 | 1650 | 1760 | 21.5 | 2000 | 9 |  | 1.2 ? |  | 625 |
| 11-25 | 5 | 1790 | 22. | 2000 | 9 |  | MOVED FLUME? | P.H LOSES | 600 |
| 11-25 | 1150 | 1820 | 22. | 2100 | 11 |  | 1. ? | 924 ? | 650 |
| 11-26 | 1000 | 1850 | 21.5 | 1950 | 11 |  | .93 | 825 | 500 |
| 11-26 | 1515 | 1880 | 22. | 1950 | 11 |  | .89 | 767 | 675 |
| 11-26 | 2310 | 1910 | 20 | 2400 | 9 |  | .87 | 740 | 670 |
| 11-27 | 810 | 1940 | 21.5 | 2650 | 9 |  | .96 | 780 | 475 |
| 11-27 | 1210 | 1970 | 22.5 | 3600 | 9 |  | .88 | 753 | 475 |
| 11-27 | 1903 | 2000 | 19. | 3000 | 9 | ↓ | .90 | 780 | 450 |

# WATER PRODUCTION AND CONDUCTIVITY DATA SHEET

OPERATOR ARCO WELL NAME & NUMBER SG #1 LOCATION ______

| DATE | TIME | DEPTH | WATER TEMPERATURE | CONDUCTIVITY MICROMHOS | INJECTED WATER (rate - glm) | FLUME SIZE | FLUME READING | PRODUCTION RATE (gpm) | AIR PRESS. REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 11-28 | 0345 | 2050 | 20. | 2500 | 9 | 6" | .89 | 764 | 450 |
| 11-28 | 1910 | 2060 | 18.5 | 2200 | 9 | | .90 | 780 | 475 |
| 11-30 | 0635 | 2090 | 16 | 2000 | | | .89 | 790 | 470 |
| 11-30 | 1530 | 2120 | 21 | 2800 | | | .95 | 852 | 525 |
| 11-30 | 1910 | 2145 | 21 | 2800 | | | .95 | 852 | 550 |
| 12-1 | 0200 | 2170 | 20 | 2000 | | | .90 | 780 | 520 |
| 12-1 | 1130 | 2200 | 21.5 | 2800 | | | .93 | 823 | 710 |
| 12-2 | 623 | 2230 | 21 | 2200 | | | .91 | 794 | 600 |
| 12-2 | 1555 | 2250 | 21.5 | 3100 | | | .86 | 727 | 700 |
| 12-2 | 1740 | 2280 | 21.5 | 3100 | | | .92 | 813 | 525 |
| 12-3 | 0550 | 2300 | 20. | 2400 | | | .84 | 767 | 750 |
| 12-3 | 1205 | 2330 | 21. | 2800 | | | .96 | 866 | 525 |
| 12-3 | 1630 | 2357 | 20 | 2500 | | | .84 | 700 | 600 |
| 12-4 | 720 | 2388 | 21 | 2800 | | | .96 | 866 | 800 |
| 12-4 | 1905 | 2420 | 20 | 3000 | | | .97 | 881 | 525 |
| 12-4 | 2300 | 2450 | 20 | 2800 | | | .95 | 852 | 725 |
| 12-5 | 1030 | 2450 | 20.5 | 3100 | | | .84 | 767 | 650 |
| 12-6 | 247 | 2510 | 20. | 3000 | | | .90 | 780 | 750 |
| | | | | | | | | | |
| | | | | | | | | | |

# WATER PRODUCTION AND CONDUCTIVITY DATA SHEET

OPERATOR ARCO WELL NAME & NUMBER SORGHUM GULCH #1A LOCATION ______

| 1975<br>DATE | TIME | DEPTH | WATER TEMPERATURE | CONDUCTIVITY MICROMHOS | INJECTED WATER (rate - glm) | FLUME SIZE | FLUME READING | PRODUCTION RATE (gpm) | AIR PRESS ~~REMARKS~~ |
|---|---|---|---|---|---|---|---|---|---|
| 1-14 | STARTEd TO MAKE WATEr @ ~300' | | | | | | NOT UP | | |
| 1-14 | 1930 | 460 | 12 | 180 | | NOT UP | " " | +20 | SOAPY |
| 1-14 | 2000 | 470 | 12 | 180 | | " | " " | +20 | SOAPY |
| 1-15 | 0243 | 500 | 12.5 | 190 | 50g/m | 6" | .42 | 233.4 | 100 |
| 1-15 | 0538 | 530 | 13.5 | 260 | 50g/m | 6" | .44 | 251.3 | 100 |
| 1-15 | 0957 | 560 | 12.5 | 1200 | 50g/m | " | .41 | 224.4 | 100 |
| 1-15 | 1315 | 590 | 13.0 | 1250 | 50g/m | " | .45 | 251.3 | 100 |
| 1-15 | 1600 | 620 | 13.0 | 1350 | 50g/m | " | .48 | 291.7 | 100 |
| 1-15 | 1850 | 650 | 13.0 | 1700 | 50g/m | " | .47 | 282.7 | 100 |
| 1-15 | 2112 | 680 | 13.0 | 1500 | 50g/m | " | .48 | 291.7 | 100 |
| 1-16 | 0026 | 700 | 13.0 | 1600 | 50g/m | " | .48 | 291.7 | 100 |
| 1-16 | 0505 | 730 | 14.0 | 2200 | 50g/m | " | .49 | 300.7 | 100 |
| 1-16 | 1516 | 760 | 15.0 | 2200 | 50 | 6" | .48 | 291.7 | 100 |
| 1-17 | 20:25 | 790 | 15.0 | 2000 | 50g/m | 6" | .50 | 310 | 100 |
| 1-17 | 2:45 | 820 | 15.0 | 2000 | 50g/m | 6" | .51 | 318 | 150 |
| 1-17 | 5:00 | 850 | 15.0 | 1700 | 50g/m | 6 | .49 | 300.9 | 150 |
| 1-17 | 0707 | 880 | 15.0 | 1800 | 50g/m | 6" | .50 | 310 | 200 |
| 1-17 | 920 | 900 | 15.0 | 1800 | 50 | 6" | .50 | 310 | 200 |
| 1-19 | [illegible] | 930 | 16.5 | 1350 | 50 | 6" | .42 | 233 | 200 |
| 1-26 | 1135 | 955 | 17.0 | 1500 | 10 | 6" | .55 | 359 | 200 |

# WATER PRODUCTION AND CONDUCTIVITY DATA SHEET

OPERATOR________ WELL NAME & NUMBER________________ LOCATION 56 1A

| DATE | TIME | DEPTH | WATER TEMPERATURE | CONDUCTIVITY MICROMHOS | INJECTED WATER (rate - glm) | FLUME SIZE | FLUME READING | PRODUCTION RATE (gpm) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 1-29 | 1345 | 1030 | 17.5 | 1250 | | 6" | .58 | 399. | |
| 1-29 | 1530 | 1060 | 17.5 | 1200 | | 6" | .58 | 399 | |
| 1-29 | 1755 | 1080 | 17.5 | 1225 | | 6" | .56 | 367 | |
| 1-29 | 1835 | 1100 | 17.5 | 1225 | | 6" | .58 | 399 | |
| 1-29 | 2035 | 1130 | 18.5 | 1200 | | 6" | .58 | 399 | 240 |
| 1-29 | 23:30 | 1160 | 19.5 | 1200 | | 6" | .54 | | 240 |
| 1-30 | 2:35 | 1180 | 18.0 | 1200 | | 6" | .55 | | 240 |
| | | | | | | | | | |
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# WATER PRODUCTION AND CONDUCTIVITY DATA SHEET

OPERATOR ARCO WELL NAME & NUMBER SORGHUM GULCH #17 LOCATION C6 TRACT

| 1974 DATE | TIME | DEPTH | WATER TEMPERATURE | CONDUCTIVITY MICROMHOS | INJECTED WATER (rate - glm) | FLUME SIZE | FLUME READING | PRODUCTION RATE (gpm) | AIR PRESSURE PSI REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 11·5 |  | 0 | °C |  |  |  |  | 0 |  |
|  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| ↓ |  | ↓ |  |  |  |  |  | ↓ |  |
| 11·7 | 0130 | 336 | 8.0 | 1400 | 4.2 | 6" | NOT UP | ± 5 | 125 |
| 11·7 | 0255 | 360 | 7.0 | 1400 | 4.2 | " | " " | ± 5 | 125 |
| 11·7 | 0615 | 390 | 7.0 | 1200 | 4.2 | " | " " | ± 5 | 150 |
| 11·7 | 0820 | 420 | 6.0 | 1200 | 4.2 | " | " " | ± 5 | 150 |
| 11·7 | 2310 | 450 | 8.0 | 950 | 10.0 | " | " " | ±10 | 150 |
| 11·8 | 0120 | 480 | 8.0 | 1500 | 10.0 | " | " " | ±10 | 125 |
| 11·8 | 0310 | 510 | 8.0 | 900 | 10.0 | " | " " | ±10 | 150 |
| 11·8 | 0525 | 540 | 8.0 | 600 | 10.0 | " | " " | ± 5 | 150 |
| 11·8 | 0725 | 570 | 8.0 | 1150 | 10.0 | " | " " | ±10 | 150 |
| 11·8 | 0920 | 600 | 10.0 | 1450 | 10.0 | " | .09 | ±15 | 150 |
| 11·8 | 1300 | 630 | 10.5 | 1450 | 10.0 | " | .04 | ± 5 | 150 |
| 11·8 | 1545 | 660 | 11.0 | 1200 | 10.0 | " | .06 | ±10 | 150 |
| 11·8 | 1705 | 690 | 11.0 | 1200 | 10.0 | " | .06 | ±10 | 150 |
| 11·8 | 1855 | 720 | 8.5 | 1100 | 10.0 | " | .05 | ± 5 | 150 |
| 11·8 | 2020 | 750 | 9.0 | 1000 | 10.0 | " | .02 | ± 5 | 175 |
| 11·8 | 2125 | 780 | 9.0 | 1000 | 10.0 | " | .02 | ± 5 | 175 |

50% INJECTED $H_2O$ & 50% FORMATION WATER

D.S.T. @436

2

# WATER PRODUCTION AND CONDUCTIVITY DATA SHEET

OPERATOR ARCO WELL NAME & NUMBER SORGHUM GULCH #17 LOCATION Cb-TRACT

| DATE | TIME | DEPTH | WATER TEMPERATURE | CONDUCTIVITY MICROMHOS | INJECTED WATER (rate - g/m) | FLUME SIZE | FLUME READING | PRODUCTION RATE (gpm) | REMARKS | |
|---|---|---|---|---|---|---|---|---|---|---|
| 11·8 | 2215 | 800 | 9.0 | 800 | 10.0 | 6" | .02 | I 5 | 175 | |
| DEPTH CORRECTION 800' EQUALS 808' | | | | | | DST | @ 808' | | | |
| 11·8 | 2255 | 808 | 10.0 | 750 | NONE | " | .07 } | PROBABLY TRUE FORATION H2O | | |
| 11·9 | 0755 | 808 | 8.0 | 750 | JETTING TEST | | | ON DST | | |
| 11·9 | 2225 | 830 | 10.0 | 850 | 5.0 | 6" | .11 | 27 | 220 | |
| 11·10 | 1740 | 860 | 10.0 | 850 | 5.0 | " | .11 | 27 | 220 | DST #3, 822-869' |
| 11·11 | 2300 | 890 | 12.0 | 850 | 10.0 | " | .13 | 36 | 220 | |
| 11·12 | 0935 | 919 | 13.0 | 800 | Hole making 27 G/M while circulating w/o soap & no injected $H_2O$ prior to DST #4 866'-919' | | | | | |
| 11·13 | 0815 | 920 | 11.0 | 800 | 10.0 | 6" | .11 | 27 | 275 | DST #5 919'-970' |
| 11·13 | 2110 | 950 | 13.5 | 850 | 10.0 | " | .01 | ±5 | 300 | |
| 11·14 | 0700 | 970 | 13.5 | 850 | 10.0 | " | .11 | 27 | 300 | |
| 11·15 | 0917 | 980 | 13.0 | 1000 | 10.0 | " | .11 | 27 | 225 | |
| 11·16 | 0539 | 1010 | 13.5 | 850 | 10.0 | " | .07 | ±15 | 250 | |
| 11·17 | 0823 | 1017 | 14.0 | 800 | Hole making 36 G/M while circulating w/o soap & no injected $H_2O$ prior to DST #6 | | | | | |
| 11·17 | 2245 | 1040 | 16.5 | 850 | 10.0 | 6" | .17 | 54 | 250 | |
| 11·18 | 0515 | 1062 | 15.5 | 900 | Hole making 36 G/M while circulating w/o soap & no injected $H_2O$ prior to DST #7 | | | | | making 5 more feet of hole |
| 11·18 | 0955 | 1067 | 15.0 | 950 | Hole making 31 G/M while circulating w/o soap & no injected $H_2O$ prior to DST #7 | | | | | |
| 11·19 | 0608 | 1070 | 14.5 | 900 | 10.0 | 6" | .15 | 45 | 250 | |
| 11·19 | 1420 | 1085 | 16.0 | 900 | 8.0 | " | .16 | 49 | 250 | |
| 11·19 | 1610 | 1090 | 16.5 | 900 | 8.0 | " | .16 | 49 | 250 | |

# WATER PRODUCTION AND CONDUCTIVITY DATA SHEET 3

OPERATOR ARCO WELL NAME & NUMBER SORGHUM GULCH #17 LOCATION C6 TRACT

| 1974 DATE | TIME | DEPTH | WATER TEMPERATURE | CONDUCTIVITY MICROMHOS | INJECTED WATER (rate - glm) | FLUME SIZE | FLUME READING | PRODUCTION RATE (gpm) | AIR PRESS psi REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 11·19 | 2107 | 1095 | 16.0 | 900 | 6.0 | 6" | .18 | 63 | 300 |
| 11·19 | 2320 | 1100 | 16.0 | 900 | 6.0 | " | .17 | 54 | 300 |
| 11·20 | 0415 | 1105 | 16.0 | 900 | 6.0 | " | .17 | 54 | 225 |
| 11·20 | 0605 | 1110 | 17.0 | 950 | 6.0 | " | .20 | 72 | 250 |
| 11·20 | 0805 | 1115 | 17.0 | 900 | 6.0 | " | .19 | 67 | 250 |
| 11·20 | 0930 | 1116.7 | 17.0 | 1000 | Making 40 g/m while circulating w/o soap & injected $H_2O$ prior to DST #8 | | | | |
| 11·21 | 0347 | 1120 | 16.5 | 950 | 6.0 | 6" | .18 | 63 | 250 |
| 11·21 | 0505 | 1125 | 16.5 | 950 | 6.0 | " | .19 | 67 | 250 |
| 11·21 | 0850 | 1130 | 17.0 | 950 | 6.0 | " | .19 | 67 | 250 |
| 11·21 | 1015 | 1135 | 17.5 | 1050 | 6.0 | " | .20 | 72 | 250 |
| 11·21 | 1610 | 1140 | 17.5 | 1050 | 6.0 | " | .23 | 90 | 250 |
| 11·21 | 1915 | 1145 | 17.0 | 1100 | 6.0 | " | .24 | 99 | 250 |
| 11·21 | 1950 | 1150 | 17.5 | 1000 | 6.0 | " | .22 | 85 | 250 |
| 11·21 | 2120 | 1155 | 17.5 | 1000 | 6.0 | " | .22 | 85 | 250 |
| 11·21 | 2255 | 1160 | 17.5 | 1000 | 6.0 | " | .22 | 85 | 275 |
| 11·21 | 2340 | 1165 | 18.0 | 1050 | 6.0 | " | .23 | 90 | 275 |
| 11·22 | 0025 | 1166 | 17.0 | 1100 | Hole making 49 g/m while circulating w/o soap & injected $H_2O$ prior to DST #9 | | | | |
| 11·22 | 2045 | 1170 | 17.0 | 1000 | 8.0 | " | .22 | 85 | 250 |
| 11·23 | 0145 | 1175 | 17.0 | 1000 | 8.0 | " | .22 | 85 | 250 |
| 11·23 | 0345 | 1180 | 17.0 | 1000 | 8.0 | " | .22 | 85 | 300 |

# WATER PRODUCTION AND CONDUCTIVITY DATA SHEET

4

OPERATOR ARCO WELL NAME & NUMBER SORGHUM GULCH #17 LOCATION Cb-TRACT

| 1974 DATE | TIME | DEPTH | WATER TEMPERATURE | CONDUCTIVITY MICROMHOS | INJECTED WATER (rate - glm) | FLUME SIZE | FLUME READING | PRODUCTION RATE (gpm) | AIR PRESS PSI REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 11·23 | 0908 | 1180 | 17.0 | 1025 | NO $H_2O$ OR SOAP COLLECT SAMPLES | 6" | .18 | 63 | 250 |
| 11·23 | 0605 | 1185 | 17.0 | 900 | 8.0 | " | .22 | 85 | 250 |
| 11·23 | 1125 | 1190 | 19.0 | 1100 | 8.0 | " | .26 | 112 | 275 |
| 11·23 | 1240 | 1195 | 19.0 | 1300 | 8.0 | " | .29 | 130 | 200 |
| 11·23 | 1400 | 1200 | 19.0 | 1280 | 8.0 | " | .30 | 139 | 200 |
| 11·23 | 1730 | 1205 | 19.0 | 1280 | 8.0 | " | .32 | 153 | 200 |
| 11·23 | 1910 | 1210 | 19.0 | 1250 | 8.0 | " | .30 | 139 | 250 |
| 11·23 | 1935 | 1212 | 19.0 | 1400 | Hole making 112 g/m while circulating w/o soap & injected $H_2O$ prior to DST #10 | | | | 200 |
| 11·25 | 0110 | 1215 | 18.5 | 1250 | 8.0 | " | .32 | 153 | 250 |
| 11·25 | 0243 | 1220 | 20.0 | 1400 | 8.0 | " | .33 | 162 | 225 |
| 11·25 | 0510 | 1224 | 19.0 | 1400 | Hole making 116 g/m while circulating w/o soap & injected $H_2O$ prior to DST'S #11 and #12 | | | | |
| 11·26 | 1200 | 1225 | 16.0 | 1500 | 8.0 | " | .34 | 171 | 225 |
| 11·26 | 1400 | 1230 | 18.5 | 1400 | 8.0 | " | .34 | 171 | 225 |
| 11·26 | 1523 | 1235 | 19.0 | 1300 | 8.0 | " | .32 | 153 | 200 |
| 11·26 | 1630 | 1240 | 19.0 | 1300 | 8.0 | " | .32 | 153 | 225 |
| 11·26 | 1835 | 1245 | 18.5 | 1350 | 8.0 | " | .31 | 144 | 225 |
| 11·26 | 1930 | 1250 | 19.0 | 1350 | 8.0 | " | .30 | 139 | 200 |
| 11·26 | 2045 | 1250 | 19.0 | 1350 | Hole making 130 g/m while circulating w/o soap & injected $H_2O$ prior to DST # 13 | | | | |
| 11·27 | 2148 | 1255 | 18.5 | 1400 | 8.0 | " | .31 | 144 | 250 |
| 11·27 | 2330 | 1260 | 19.0 | 1400 | 8.0 | " | .30 | 139 | 250 |

# WATER PRODUCTION AND CONDUCTIVITY DATA SHEET

OPERATOR ARCO WELL NAME & NUMBER SORGHUM GULCH #17 LOCATION C6-TRACT

| 1974 DATE | TIME | DEPTH | WATER TEMPERATURE | CONDUCTIVITY MICROMHOS | INJECTED WATER (rate - glm) | FLUME SIZE | FLUME READING | PRODUCTION RATE (gpm) | AIR PRESS psi REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 11·28 | 0228 | 1265 | 19.0 | 1400 | 8.0 | 6" | .30 | 139 | 250 |
| 11·28 | 0355 | 1270 | 19.0 | 1200 | 15.0 | " | .30 | 139 | 325 |
| 11·28 | 0637 | 1275 | 19.0 | 1300 | Hole making 103 g/m while circulating w/o soap & injected $H_2O$ prior to DST #14 | | | | |
| 11·28 | 1215 | 1280 | 19.0 | 1300 | Hole making 153 g/m while circulating w/o soap & injected $H_2O$ prior to DST #14 | | | | |
| 11·29 | 0904 | 1285 | 18.0 | 1100 | 8.0 | " | .32 | 153 | 275 |
| 11·29 | 0951 | 1290 | 18.5 | 1350 | 8.0 | " | .32 | 153 | 300 |
| 11·29 | 1047 | 1295 | 18.5 | 1400 | 8.0 | " | .35 | 175 | 300 |
| 11·29 | 1538 | 1300 | 18.5 | 1350 | 8.0 | " | .29 | 130 | 300 |
| 11·29 | 1744 | 1305 | 19.5 | 1300 | 8.0 | " | .33 | 162 | 250 |
| 11·29 | 1938 | 1309 | 19.5 | 1200 | 8.0 | " | .34 | 171 | 300 |
| 11·29 | 2005 | 1309 | 19.5 | ✓1200 | Hole making 144 g/m while circulating w/o soap & injected $H_2O$ prior to DST #15 | | | | |
| 11·30 | 1115 | 1315 | 20.0 | 1200 | 8.0 | " | .32 | 153 | 300 |
| 12·1 | 0150 | 1320 | 20.0 | 1200 | 8.0 | " | .21 | 81 | 300 |
| 12·1 | 0800 | 1325 | 20.0 | 1200 | 8.0 | " | .38 | 202 | 300 |
| 12·1 | 1322 | 1330 | 19.5 | 1200 | 8.0 | " | .40 | 215 | 300 |
| 12·1 | 1413 | 1335 | 19.5 | 1200 | 8.0 | " | .43 | 242 | 325 |
| 12·1 | 1437 | 1336 | 20.0 | ✓1250 | Hole making 215 g/m while circulating w/o soap & injected $H_2O$ prior to DST #16 | | | | |
| 12·2 | 1625 | 1340 | 21.0 | 1200 | 8.0 | " | .46 | 274 | 250 |
| 12·2 | 1750 | 1345 | 19.0 | 1200 | 8.0 | " | .46 | 274 | 250 |
| 12·2 | 2100 | 1350 | 20.0 | 1200 | 8.0 | " | .46 | 274 | 275 |

# WATER PRODUCTION AND CONDUCTIVITY DATA SHEET

6

OPERATOR ARCO WELL NAME & NUMBER SORGHUM GULCH #17 LOCATION Cb-TRACT

| 1974 DATE | TIME | DEPTH | WATER TEMPERATURE | CONDUCTIVITY MICROMHOS | INJECTED WATER (rate - glm) | FLUME SIZE | FLUME READING | PRODUCTION RATE (gpm) | AIR PRESS PSI REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 12·3 | 0005 | 1355 | 20.0 | 1200 | 8 | 6" | .46 | 274 | 300 |
| 12·3 | 0350 | 1360 | 21.0 | 1150 | 8 | " | .43 | 272 | 300 |
| 12·3 | 0740 | 1365 | 21.5 | 1150 | 8 | " | .49 | 291 | 300 |
| 12·3 | 0910 | 1370 | 21.0 | 1200 | 8 | " | .52 | 328 | 275 |
| 12·3 | 1025 | 1374 | 21.5 | 1150 | Hole making 260 g/m while circulating w/o soap & injected H2O prior to DST #17 | | | | |
| 12·4 | 0500 | 1375 | 20.0 | 1300 | 8 | " | .49 | 291 | 300 |
| 12·4 | 0900 | 1380 | 19.0 | 1200 | 8 | " | .52 | 328 | 250 |
| 12·4 | 0923 | 1385 | 21.5 | 1200 | 8 | " | .52 | 328 | 250 |
| 12·4 | 1005 | 1390 | 21.5 | 1200 | 8 | " | .50 | 310 | 250 |
| 12·4 | 1109 | 1395 | 21.0 | 1200 | 8 | " | .50 | 310 | 225 |
| 12·4 | 1147 | 1400 | 21.0 | 1200 | 8 | " | .50 | 310 | 250 |
| 12·4 | 1222 | 1405 | 21.0 | 1200 | 8 | " | .50 | 310 | 225 |
| 12·4 | 1513 | 1410 | 22.0 | 1250 | 11 | " | .52 | 328 | 225 |
| 12·4 | 1622 | 1475 | 23.0 | 1200 | 11 | " | .51 | 319 | 250 |
| 12·4 | 1750 | 1420 | 22.0 | 1250 | Hole making 215 g/m while circulating w/o soap & injected H2O prior to DST #18 | | | | |
| 12·5 | 1145 | 1420 | 21.0 | 1200 | 11 | " | .56 | 368 | 225 |
| 12·5 | 1320 | 1425 | 22.0 | 1200 | 11 | " | .55 | 359 | 225 |
| 12·5 | 1825 | 1430 | 21.0 | 1200 | 11 | " | .56 | 368 | 300 |
| 12·5 | 2015 | 1435 | 22.0 | 1200 | 11 | " | .53 | 341 | 400 |
| 12·5 | 2055 | 1440 | 22.0 | 1200 | 11 | " | .54 | 350 | 325 |

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# WATER PRODUCTION AND CONDUCTIVITY DATA SHEET

OPERATOR ARCO WELL NAME & NUMBER SORGHUM GULCH #17 LOCATION Cb-TRACT

| DATE | TIME | DEPTH | WATER TEMPERATURE | CONDUCTIVITY MICROMHOS | INJECTED WATER (rate - glm) | FLUME SIZE | FLUME READING | PRODUCTION RATE (gpm) | AIR PRESS REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 12·5 | 2210 | 1445 | 22.0 | 1200 | 11 | 6" | .54 | 350 | 375 |
| 12·5 | 2305 | 1450 | 22.0 | 1400 | 11 | " | .54 | 350 | 400 |
| 12·6 | 0345 | 1455 | 22.0 | 1350 | 11 | " | .56 | 368 | 375 |
| 12·6 | 0450 | 1460 | 22.0 | 1400 | 11 | " | .49 | 301 | 600 |
| 12·6 | 0900 | 1465 | 22.0 | 1400 | 11 | " | .54 | 350 | 300 |
| 12·6 | 0950 | 1470 | 22.0 | 1100 | 11 | " | .56 | 368 | 300 |
| 12·6 | 1022 | 1470 | 22.0 | 1150 | Hole making 292g/m prior to DST #19 while circulating w/o soap or injected $H_2O$ & MPT #1, 2, 3, & 4 | | | | |
| 12·9 | 0430 | 1475 | 20.0 | 1200 | 11 | " | .57 | 381 | 400 |
| 12·9 | 0520 | 1480 | 22.0 | 1150 | 11 | " | .54 | 350 | 425 |
| 12·9 | 0645 | 1485 | 21.5 | 1100 | 11 | " | .56 | 368 | 400 |
| 12·9 | 0720 | 1490 | 21.5 | 1100 | 11 | " | .53 | 341 | 325 |
| 12·9 | 0840 | 1495 | 21.5 | 1100 | 11 | " | .53 | 341 | 250 |
| 12·9 | 1007 | 1500 | 22.0 | 1150 | 11 | " | .46 | 274 | 300 |
| 12·9 | 1413 | 1505 | 22.0 | 1100 | 11 | " | .54 | 350 | 300 |
| | | | | | | | | | |
| | | | | | | | | | |
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# WATER PRODUCTION AND CONDUCTIVITY DATA SHEET

OPERATOR Arco WELL NAME & NUMBER Sorghum Gulch #17 LOCATION Cb-Tract

| DATE | TIME | DEPTH | WATER TEMPERATURE | CONDUCTIVITY MICROMHOS | INJECTED WATER (rate - glm) | FLUME SIZE | FLUME READING | PRODUCTION RATE (gpm) | Air Pressure ~~REMARKS~~ |
|---|---|---|---|---|---|---|---|---|---|
| 12/9 | 1535 | 1510 | 22.0 | 1100 | 11 | 6" | .56 | 368 | 300 |
| 12/9 | | 1515 | 22.0 | 1100 | 11 | 6" | .56 | 368 | 250 |
| 12/9 | 1815 | 1520 | 21.5 | 1100 | 11 | 6" | .55 | 359 | 200 |
| 12/9 | 1907 | 1522 | 22.0 | 1150 | NONE | 6" | .48 | 292 DST #21 | 250 |
| 12/11 | 0627 | 1527 | 19.5 | 1000 | 11 | 6" | .54 | 350 | 300 |
| 12/11 | 0745 | 1530 | 19.5 | 1050 | 11 | 6" | .50 | 310 | 300 |
| 12/11 | 0830 | 1535 | 20.0 | 1050 | 11 | 6" | .51 | 319 | 275 |
| 12/11 | 1015 | 1540 | 20.0 | 1050 | 11 | 6" | .52 | 328 | 275 |
| 12/11 | 1127 | 1545 | 21.0 | 1100 | 11 | 6" | .50 | 310 | 325 |
| 12/11 | 1850 | 1550 | 21.5 | 1100 | 11 | 6" | .51 | 319 | 300 |
| 12/11 | 2104 | 1555 | 21.5 | 1100 | 11 | 6" | .50 | 310 | 300 |
| 12/11 | 2251 | 1560 | 21.5 | 1100 | 11 | 6" | .51 | 319 | 300 |
| 12/12 | 0312 | 1565 | 21.0 | 1100 | 11 | 6" | .51 | 319 | 300 |
| 12/12 | 0349 | 1570 | 21.0 | 1100 | 11 | 6" | .50 | 310 | 300 |
| 12/12 | 2256 | 1575 | 20.0 | 1150 | 11 | 6" | .51 | 319 | 260 |
| 12/13 | 0031 | 1580 | 21.0 | 1150 | 11 | 6" | .52 | 328 | 260 |
| 12/13 | 0324 | 1585 | 21.5 | 1100 | 11 | 6" | .54 | 350 | 260 |
| 12/13 | 0815 | 1590 | 20.0 | 1150 | 11 | 6" | .50 | 310 | 300 |
| 12/13 | 0901 | 1595 | 20.0 | 1150 | 11 | 6" | .51 | 319 | 300 |
| 12/13 | 1012 | 1600 | 20.0 | 1150 | 11 | 6" | .44 | 251 | 300 |

# WATER PRODUCTION AND CONDUCTIVITY DATA SHEET

OPERATOR ARCO ET AL WELL NAME & NUMBER SORGHUM GULCH #17 LOCATION C6 TRACT

| 1974 DATE | TIME | DEPTH | WATER TEMPERATURE | CONDUCTIVITY MICROMHOS | INJECTED WATER (rate - glm) | FLUME SIZE | FLUME READING | PRODUCTION RATE (gpm) | AIR PRESSURE REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 12·13 | 1235 | 1610 | 20.5 | 1150 | 11 | 6" | .54 | 350 | 300 |
| 12·13 | 1813 | 1620 | 20.0 | 1150 | 11 | " | .50 | 310 | 300 |
| 12·14 | 2220 | 1630 | 21.0 | 1100 | 11 | " | .50 | 310 | 300 |
| 12·44 | 2400 | 1640 | 21.0 | 1100 | 11 | " | .51 | 319 | 300 |
| 12·15 | 0220 | 1650 | 21.5 | 1100 | 11 | " | .53 | 341 | 325 |
| 12·15 | 0635 | 1660 | 22.0 | 1100 | 11 | " | .52 | 328 | 300 |
| 12·15 | 1015 | 1670 | 21.5 | 1150 | 11 | " | .56 | 368 | 500 |
| 12·16 | 0720 | 1680 | 21.5 | 1200?? | 11 | " | .53 | 341 | 300 |
| 12·16 | 1320 | 1690 | 22.0 | 1200 | 11 | " | .49 | 301 | 275 |
| 12·16 | 1535 | 1700 | 22.5 | 1200 | 11 | " | .47 | 283 | 325 |
| 12·16 | 2130 | 1710 | 22.0 | 1300 | 11 | " | .52 | 328 | 325 |
| 12·16 | 2247 | 1720 | 22.5 | 1150 | Hole making #26 | 319 g/m while | circulating | prior to | DST 325 |
| 12·17 | 1825 | 1730 | 21.5 | 1300 | 11 | " | .49 | 301 | 250 |
| 12·18 | 2430 | 1740 | 22.0 | 1200 | 11 | " | .48 | 292 | 325 |
| 12·18 | 0200 | 1750 | 22.0 | 1200 | 11 | " | .49 | 283 | 325 |
| 12·18 | 0445 | 1760 | 22.5 | 1300 | 11 | " | .49 | 301 | 325 |
| 12·18 | 1000 | 1770 | 22.5 | 1300 | 11 | " | .44 | 251 | 300 |
| 12·18 | 1040 | 1770 | 22.5 | 1300 | Hole making #27 | 292 g/m while | circulating | prior to | DST 300 |
| 12·19 | 0605 | 1780 | 22.0 | 1200 | 8 | " | .50 | 310 | 300 |
| 12·19 | 0855 | 1790 | 22.5 | 1350 | 8 | " | .48 | 292 | 310 |

## WATER PRODUCTION AND CONDUCTIVITY DATA SHEET

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OPERATOR ARCO ETAL WELL NAME & NUMBER SORGHUM GULCH #17 LOCATION C6-TRACT

| 1974<br>DATE | TIME | DEPTH | WATER TEMPERATURE | CONDUCTIVITY MICROMHOS | INJECTED WATER (rate - glm) | FLUME SIZE | FLUME READING | PRODUCTION RATE (gpm) | Air Pressure ~~REMARKS~~ |
|---|---|---|---|---|---|---|---|---|---|
| 12/19 | 855 | 1790 | 22.5 | 1350 | 8 | 6" | .48 | 292 | 310 |
| 12/19 | 1000 | 1800 | 22.5 | 1400 | 8 | 6" | .45 | 260 | 300 |
| 12/19 | 1600 | 1810 | 22.5 | 1400 | 8 | 6" | .52 | 328 | 300 |
| 12/19 | 1815 | 1820 | 22.0 | 1400 | 8 | 6" | .52 | 328 | 300 |
| 12/19 | 1900 | 1820 | 22.0 | 1400 | DST# 28 | | .49 | 301 | 300 |
| 12/20 | 1700 | 1830 | 23.0 | 1350 | 8 | 6" | .46 | 274 | 325 |
| 12/21 | 0025 | 1840 | 22.5 | 1350 | 8 | 6" | .48 | 292 | 325 |
| 12/21 | 240 | 1850 | 23.0 | 1400 | 8 | 6" | .48 | 292 | 300 |
| 12/21 | 1000 | 1860 | 23.0 | 1500 | 8 | 6" | .52 | 328 | 325 |
| 12/21 | 1220 | 1870 | 23.0 | 1500 | 8 | 6" | .51 | 319 | — |
| 12/21 | 1250 | 1870 | 23.0 | 1450 | DST# 29 | | .46 | 274 | 300 |
| 12/22 | — | 1880 | 23.0 | 1400 | 11 | 6" | .51 | 319 | 300 |
| 12/22 | 1457 | 1890 | 24.0 | 1600 | 11 | 6" | .57 | 381 | 325 |
| 12/22 | 1725 | 1900 | 24.0 | 1600 | 11 | 6" | .52 | 328 | 325 |
| 12/22 | 2120 | 1910 | 24.5 | 1600 | 11 | 6" | .53 | 341 | 360 |
| 12/23 | 555 | 1920 | 24.5 | 1600 | 11 | 6" | .55 | 359 | 350 |
| 12/23 | 620 | 1920 | 23.0 | 1600 | DST#30 | | .09 | 22 | 400 |
| 12/28 | 1145 | Static | water level | w/o pipe | = 428.7 below Surface | | | | |
| 12/29 | 1205 | 1926 | 20.0 | 1800 | 11 | 6" | .51 | 319 | 350 |
| 12/29 | 1440 | 1936 | 22.0 | 1800 | 11 | 6" | .53 | 341 | 375 |

# WATER PRODUCTION AND CONDUCTIVITY DATA SHEET

OPERATOR ARCO WELL NAME & NUMBER SORGHUM GULCH #17 LOCATION Cb-TRACT

| 1974<br>DATE | TIME | DEPTH | WATER TEMPERATURE | CONDUCTIVITY MICROMHOS | INJECTED WATER (rate - glm) | FLUME SIZE | FLUME READING | PRODUCTION RATE (gpm) | AIR PRESS REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 12·29 | 1824 | 1946 | 20.0°C | 1850 | 11 | 6" | .51 | 319 | 350 |
| 12·29 | 2135 | 1956 | 23.0 | 1600 | 11 | " | .49 | 301 | 375 |
| 12·30 | 0105 | 1966 | 24.0 | 1600 | 11 | " | .52 | 328 | 400 |
| 12·30 | 0210 | 1967 | 24.0 | 1600 | NONE | " | .50 | 310 | 350 |
| 12·31 | 0715 | 1977 | 24.0 | 1700 | 11 | " | .52 | 328 | 425 |
| 12·31 | 1040 | 1987 | 22.0 | 1700 | 11 | " | .50 | 310 | 350 |
| 12·31 | 1310 | 1997 | 21.0 | 1650 | 11 | " | .46 | 274 | 350 |
| 12·31 | 1520 | 2007 | 24.0 | 1700 | 11 | " | .50 | 310 | 375 |
| 12·31 | 1800 | 2017 | 23.0 | 1750 | 11 | " | .50 | 310 | 375 |
| 12·31 | 1940 | 2020 | 23.0 | 1750 | Prep for DST # 32 | " | .49 | 301 | 350 |
| 1975 | | | | | | | | | |
| 1·1 | 1740 | 2030 | 23.0 | 1800 | 11 | " | .50 | 310 | 375 |
| 1·1 | 2105 | 2040 | 24.0 | 1200? | 11 | " | .51 | 319 | 350 |
| 1·1 | 2310 | 2050 | 24.0 | 1650 | 11 | " | .48 | 292 | 350 |
| 1·2 | 0135 | 2060 | 24.0 | 1400? | 11 | " | .53 | 341 | 350 |
| 1·2 | 0455 | 2070 | 24.0 | 1750 | 11 | " | .51 | 319 | 350 |
| 1·2 | 0525 | 2070 | 24.0 | 2000 | Prep for DST # 33 | " | .49 | 301 | 400 |
| 1·2 | 2040 | 2080 | 24.0 | 1700 | 11 | " | .52 | 328 | 350 |
| 1·2 | 2230 | 2090 | 24.0 | 1700 | 11 | " | .44 | 251 | 350 |
| 1·3 | 0045 | 2100 | 24.0 | 1700 | 11 | " | .50 | 310 | 350 |

# WATER PRODUCTION AND CONDUCTIVITY DATA SHEET

12

OPERATOR Arco WELL NAME & NUMBER SG#17 LOCATION

| DATE | TIME | DEPTH | WATER °C TEMPERATURE | CONDUCTIVITY MICROMHOS | INJECTED WATER (rate - glm) | FLUME SIZE | FLUME READING | PRODUCTION RATE (gpm) | Air Pressure ~~REMARKS~~ |
|---|---|---|---|---|---|---|---|---|---|
| 1/3/75 | 0045 | 2100 | 24.0 | 1700 | 11 | 6" | .50 | 310 | 350 |
| 1/3/75 | 0305 | 2110 | 24.0 | 1600 | 11 | 6" | .52 | 328 | 375 |
| 1/3/75 | 0540 | 2117 | 24.0 | 1950 | Prep. for DST | 6" | .25 | 103 | 375 |
| 1/3/75 | 1620 | 2120 | 22.0 | 3900 | 11 | 6" | .48 | 292 | 350 |
| 1/3/75 | 1850 | 2130 | 24.0 | 3900 | 11 | 6" | .58 | 390 | 375 |
| 1/3/75 | 2340 | 2140 | 25.0 | 3800 | 11 | 6" | .53 | 341 | 350 |
| 1/4/75 | 0545 | 2150 | 25.0 | 4100 | 11 | 6" | ~~.49~~ .52 | ~~301~~ 328 | ~~360~~ 350 |
| 1/4/75 | ~~1020~~ 0745 | ~~2170~~ 2160 | 25.0 | 4000 | 11 | 6" | .49 | 301 | 360 |
| 1/4/75 | 1020 | 2170 | 24.0 | 4200 | Prep DST#34 | 6" | .51 | 319 | 375 |
| 1/5/75 | 0818 | 2180 | 24.0 | 5000 | 11 | 6" | .47 | 283 | 350 |
| 1/5/75 | 1028 | 2190 | 24.0 | 4200 | 11 | 6" | .50 | 310 | 350 |
| 1/5/75 | 1405 | 2200 | 25.0 | 3800 | 11 | 6" | .51 | 319 | 325 |
| 1/5/75 | 1627 | 2210 | 24.5 | 3800 | 11 | 6" | .51 | 319 | 350 |
| 1/5/75 | 1820 | 2220 | 25.0 | 3700 | 11 | 6" | .52 | 328 | 350 |
| 1/5/75 | 1855 | 2220 | 24.0 | 3800 | Prep DST#35 | 6" | .51 | 319 | 350 |
| 1/6/75 | 0040 | 2230 | 24.5 | 3700 | 11 | 6" | .51 | 319 | 350 |
| 1/6/75 | 0205 | 2240 | 25.0 | 3200 | 11 | 6" | .52 | 328 | 350 |
| 1/6/75 | 0340 | 2250 | 25.0 | 3400 | 11 | 6" | .52 | 328 | 350 |
| 1/6/75 | 1245 | 2263 | 25.0 | 4400 | 11 | 6" | .48 | 292 | 350 |
| 1/6/75 | 1450 | 2270 | 25.0 | 4500 | Prep DST#35 | 6" | .56 | 368 | 350 |

# WATER PRODUCTION AND CONDUCTIVITY DATA SHEET

OPERATOR Arco WELL NAME & NUMBER SG#17 LOCATION

| DATE | TIME | DEPTH | WATER °C TEMPERATURE | CONDUCTIVITY MICROMHOS | INJECTED WATER (rate - glm) | FLUME SIZE | FLUME READING | PRODUCTION RATE (gpm) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 1/7/75 | 0510 | 2280 | 25.0 | 3600 | 11 | 6" | .58 | 399 | 375 |
| 1/7/75 | 0825 | 2290 | 24.0 | 4000 | 11 | 6" | .52 | 328 | 375 |
| 1/7/75 | 1025 | 2300 | 24.0 | 5400 | 11 | 6" | .38 | 202 | 350 |
| 1/7/75 | 1207 | 2310 | 24.0 | 3700 | 11 | 6" | .54 | 350 | 350 |
| 1/7/75 | 1430 | 2320 | 24.0 | 4000 | Prep DST #36 | 6" | .52 | 328 | 350 |
| 1/7/75 | 1910 | 2325 | 24.0 | 3800 | 11 | 6" | .54 | 350 | 375 |
| 1/7/75 | 2012 | 2330 | 24.0 | 3800 | 11 | 6" | .58 | 399 | 350 |
| 1/7/75 | 2110 | 2335 | 24.0 | 3800 | 11 | 6" | .56 | 368 | 350 |
| 1/7/75 | 2355 | 2345 | 24.0 | 3900 | 11 | 6" | .55 | 359 | 375 |
| 1/8/75 | 0655 | 2355 | 24.0 | 3600 | 11 | 6" | .56 | 368 | 350 |
| 1/8/75 | 0940 | 2370 | 21.0 | 3200 | Prep DST #36 | 6" | .38 | 202 | 350 |
| 1/9/75 | 0650 | 2380 | 24.0 | 5000 | 11 | 6" | .49 | 301 | 350 |
| 1/9/75 | 0720 | 2383 | 23.0 | 5200 | 11 | 6" | .50 | 310 | 350 |
| 1/9/75 | 0830 | 2393 | 23.0 | 5200 | 11 | 6" | .50 | 310 | 350 |
| 1/9/75 | 0945 | 2400 | 24.5 | 3800 | 11 | 6" | .52 | 328 | 400 |
| 1/10/75 | 1025 | 2415 | 24.0 | 4000 | 11 | 6" | .52 | 328 | 375 |
| 1/10/75 | 1246 | 2425 | 25.0 | 3400 | 11 | 6" | .53 | 341 | 375 |
| 1/10/75 | 1605 | 2435 | 25.0 | 2750 | 11 | 6" | .48 | 292 | 375 |
| 1/11/75 | 0145 | 2445 | 25.0 | 2900 | 11 | 6" | .49 | 301 | 360 |
| 1/11/75 | 0415 | 2455 | 25.0 | 3050 | 11 | 6" | .51 | 319 | 375 |

# WATER PRODUCTION AND CONDUCTIVITY DATA SHEET

OPERATOR ARCO WELL NAME & NUMBER SG - 20 LOCATION Cb

| DATE | TIME | DEPTH | WATER TEMPERATURE | CONDUCTIVITY MICROMHOS | INJECTED WATER (rate - glm) | FLUME SIZE | FLUME READING | PRODUCTION RATE (gpm) | Air Pressure ~~REMARKS~~ |
|---|---|---|---|---|---|---|---|---|---|
| 12/3 | 1010 | 220' | 5.5° | 5000 | 38 gpm | 6" | Not UP | 5 gpm ± | 50 lbs Still in Cement |
| 12/3 | 1227 | 250 | 8° | 1400 | 38 | | " | 5 gpm ± | 75 lbs |
| 12/3 | 1428 | 280 | 9° | 1350 | 38 | | " | 7 gpm ± | 50 |
| 12/3 | 1647 | 310 | 9° | 900 | 30 | | " | 15 gpm ± | 50 |
| 12/3 | 1852 | 340 | 6.5° | 1000 | 30 | | " | " | 50 |
| 12/3 | 2035 | 370 | 7° | 750 | 30 | | " | " | 100 |
| 12/3 | 2207 | 400 | 8° | 850 | 30 | | " | " | 100 |
| 12/3 | 2305 | 425 | 8° | 900 | 30 | | " | " | 100 |
| 12/4 | 0102 | 455 | 8° | 900 | 30 | | " | " | 100 |
| 12/4 | 0500 | 485 | 10° | 850 | 30 | | " | " | 100 |
| 12/4 | 0917 | 515 | 10.5° | 850 | 32 | | .04 | > 10 gpm | 100 |
| 12/4 | 1736 | 545 | 11.5° | 875 | 32 | | Not UP | 10 ± | 75 |
| 12/4 | 1833 | 560 | 12° | 850 | 32 | | .04 | > 10 gpm | 100 |
| 12/4 | 2158 | 590 | 12° | 750 | 50 | | .09 | 20 gpm | 100 |
| 12/4 | 2350 | 620 | 11° | 900 | 50 | | .08 | 18 gpm | 100 |
| 12/5 | 0124 | 650 | 12° | 900 | 50 | | .09 | 20 gpm | 100 |
| 12/5 | 0454 | 677 | 13° | 1000 | 50 | | .05 | 10 gpm | 100 |
| 12/5 | 0821 | 700 | 13° | 1100 | 50 | | .08 | 18 gpm | 100 |
| 12/5 | 1202 | 730 | 13.5° | 1200 | 50 | | .09 | 20 gpm | 100 |
| 12/5 | 1543 | 760 | 14.5° | 1800 | 50 | | .05 | 10 gpm | 125 |

# WATER PRODUCTION AND CONDUCTIVITY DATA SHEET

OPERATOR ARCO WELL NAME & NUMBER SG-20 LOCATION Cb

| DATE | TIME | DEPTH | WATER TEMPERATURE | CONDUCTIVITY MICROMHOS | INJECTED WATER (rate - glm) | FLUME SIZE | FLUME READING | PRODUCTION RATE (gpm) | Air Pressure ~~REMARKS~~ |
|---|---|---|---|---|---|---|---|---|---|
| 12/5 | 1847 | 790 | 15° | 2200 | 50 | 6" | .12 | 31 | 150 |
| 12/5 | 2139 | 820 | 16° | 2200 | | | .13 | 36 | 150 |
| 12/6 | 0204 | 850 | 17° | 2200 | | | .16 | 49 | 150 |
| 12/6 | 1827 | 880 | 19.5° | 2700 | | | .45 | 260 | 300 |
| 12/7 | 0918 | 910 | 20.5° | 2700 | | | .50 | ~~260~~ 310 | 300 |
| 12/8 | 1449 | 940 | 20.5° | 2700 | | | .55 | ~~310~~ 359 | 225 |
| 12/10 | 1040 | 970 | 20.5° | 2700 | | | .54 | ~~359~~ 350 | 250 |
| 12/10 | 0305 | 981.5 TD | 19° | 2400 | | | .54 | 350 | 225 |
| 12/10 | 0340 | 981.5 | 19° | 2400 | | | .55 | ~~350~~ 359 | 250 |
| 12/10 | without Soap | 981.5 | 19° | 2400 | | | .55 | 359 | 250 |

# WATER PRODUCTION AND CONDUCTIVITY DATA SHEET

OPERATOR ARCO WELL NAME & NUMBER SORGHUM GULCH #21 LOCATION Cb-TRACT

| DATE | TIME | DEPTH | WATER TEMPERATURE | CONDUCTIVITY MICROMHOS | INJECTED WATER (rate - glm) | FLUME SIZE | FLUME READING | PRODUCTION RATE (gpm) | AIR PRESSURE ~~REMARKS~~ |
|---|---|---|---|---|---|---|---|---|---|
| 12-15-74 | 1845 | 450 | 11 | 1200 | 10 | 6" | .12 | 31.4 | 150 |
| 12-15 | 2200 | 480 | 12 | 1000 | | | .10 | 22.4 | 150 |
| 12-15 | 2240 | 510 | 12 | 1000 | | | .11 | 26.9 | 150 |
| 12-15 | 2320 | 540 | 12 | 900 | | | .11 | 26.9 | 150 |
| 12-15 | 2350 | 570 | 12 | 900 | | | .14 | 40.4 | 150 |
| 12-16 | | 600 | 13 | 900 | | | .09 | 19. | 150 |
| 12-16 | 152 | 630 | 13 | 1000 | | | .07 | 15. | 150 |
| 12-16 | 255 | 660 | 13 | 1000 | | | .07 | 15. | 150 |
| 12-16 | 950 | 690 | 13 | 1100 | | | .08 | 18. | 150 |
| 12-16 | 1326 | 720 | 13 | 1100 | | | .07 | 15. | 150 |
| 12-17 | 1037 | 750 | 12 | 3600? | | | .05 | 11. | 100 |
| 12-17 | 1154 | 780 | 15 | 8000 | | | .11 | 26.9 | 100 |
| 12-17 | 1314 | 810 | 18 | 750 | | | reset Flume | | 175 |
| 12-17 | 1700 | 840 | 18 | 750 | | | .58 | 390 | 200 |
| 12-18 | 0006 | 870 | 17.5 | 750 | | | FLUME | OUT | 200 |
| 12-18 | 0540 | 900 | 17. | 725 | | | " | " | 200 |
| 12-18 | 725 | 930 | 17.5 | 750 | | | " | " | 200 |
| 12-18 | 1706 | 966 | 16. | 750 | | | .69 | 516 | 400 |
| 12-18 | 2140 | 975 | 16.5 | 750 | | | .67 | 493 | 400 |
| 12-19 | 500 | 1005 | 18. | 800 | | ↓ | .50 | 309. | 400 |
| 12-19 | 1042 | 1025 | 17. | 800 | ↓ | 6" | FLUME OUT | ≈300 g/m | 400 |

Water Quality Drilling

## II B-4 WATER QUALITY - DRILLING WATER

During the drilling of a well or core hole, samples of the produced water are collected for analysis. Jetting test samples are collected for every well. It should be noted that the sample depth indicates the depth at which the drilling bit was located when the sample was taken. Since the samples are taken from the drilling water flow line, the data reflect a composite of conditions from surface to drilling bit depth.

Samples were also taken during drill stem tests which were conducted in some of the wells. In a drill stem test, a packer is used to isolate a portion of the well bore at some interval above the bottom of the hole and water is then jetted from the isolated interval. The sample collected should represent ground-water conditions in the discrete subsurface interval between the packer and the bottom of the well.

Tables II B-4.1 and II B-4.2 list the water samples collected from jetting tests and drill stem tests for which data are presented in Quarterly Report #2.

## TABLE II B-4.1

## WATER QUALITY SAMPLES

## JETTING TESTS AND DRILL STEM TESTS

| Well | Test | Sample Depth Feet |
|---|---|---|
| SG-1 | JT | 613 |
| SG-1 | JT | 706 |
| SG-1 | JT | 990 |
| SG-1 | JT | 1105 |
| SG-1 | JT | 2179 |
| SG-1 | JT | 2525 |
| SG-1 | DST | lower zone (below 1930 |
| SG-20 | JT | 515 |
| SG-20 | JT | 850 |
| SG-20 | JT | 987 |
| SG-20 | DST | 945 |
| SG-21 | JT | 676 |
| SG-21 | JT | 980 |
| SG-21 | JT | 1035 |
| SG-21 | DST | 1000-1035 |
| SG-21 | DST | 950-1009 |
| SG-8 | JT | 600 |
| SG-8 | JT | 971 |
| SG-8 | JT | 1013 |
| SG-8 | JT | 2117 |
| SG-8 | JT | 2608 |
| SG-8 | DST | lower zone (below 1910) |
| SG-8 | DST | upper zone (950 to surface) |

JT = Jetting Tests
DST = Drill Stem Tests

TABLE II B-4.2

## Water Quality Samples Collected During The Drilling of SG-17

| Sample No. | Drill Stem Test No. | Sample Interval (Feet) | Sample Type |
|---|---|---|---|
| 1 | DST 1 | 788-808 | Environmental (1) |
| 2 | | 859 | Minimum (2) |
| 3 | DST 3 | 822-869 | Minimum |
| 4 | DST 4 | 866-919 | Minimum |
| 5 | DST 5 | 919-970 | Minimum |
| 6 | DST 6 | 970-1017 | Minimum |
| 7 | DST 7 | 1015-1062 | Environmental |
| 8 | DST 8 | 1066-1117 | Environmental |
| 9 | DST 9 | 1115-1166 | Minimum |
| 10 | | 1180 | Minimum |
| 11 | DST 10 | 1164-1212 | Minimum |
| 12 | DST 11 | 1200-1224 | Minimum |
| 13 | DST 13 | 1224-1250 | Minimum |
| 14 | DST 14 | 1250-1271 | Minimum |
| 15 | DST 15 | 1280-1309 | Minimum |
| 16 | DST 17 | 1329-1374 | Minimum |
| 17 | DST 18 | 1374-1419 | Minimum |
| 18 | DST 19 | 1423-1470 | Minimum |
| 19 | DST 21 | 1473-1522 | Minimum |
| 20 | DST 23 | 1514-1752 | Minimum |
| 21 | DST 24 | 1561-1622 | Minimum |
| 22 | DST 25 | 1618-1670 | Minimum |
| 23 | | 1622 | Minimum |
| 24 | DST 26 | 1668-1720 | Minimum |
| 25 | DST 27 | 1711-1770 | Minimum |
| 26 | DST 28 | 1768-1820 | Minimum |
| 27 | DST 29 | 1818-1870 | Minimum |
| 28 | DST 30 | 1869-1920 | Minimum |
| 29 | DST 31 | 1918-1970 | Minimum |
| 30 | DST 34 | 2120-2170 | Environmental |
| 31 | | 2608 | Minimum |

(1) Complete chemical analysis per environmental baseline samples.
(2) Minimum analysis done.

## TABLE II B 4.3

## WATER QUALITY ANALYSIS
## DRILLING WATER

Well Number: SG-1

| | Depth at Which Sample Taken | 613' | 706' | 990' | 1105' | 2179' |
|---|---|---|---|---|---|---|
| | Element Measured | | | | | |
| 1. | Aluminum (ug/l) | .1 | <.1 | .4 | | |
| 2. | Ammonia (mg/l) | .5 | 5 | .4 | .4 | |
| 3. | Arsenic (ug/l) | .02 | <.01 | .02 | (.08) | |
| 4 | Barium (ug/l) | .2 | <1 | .1 | <1 | |
| 5. | Beryllium (ug/l) | <.002 | | .001 | .001 | |
| 6. | Bicarbonate (mg/l) | 460 | 520 | 500 | 580 | 1330 |
| 7. | Bismuth (ug/l) | <.002 | | <.003 | <.003 | |
| 8. | Boron (ug/l) | 4 | 2.7 | 2.8 | 2.3 | 1.9 |
| 9. | Cadmium (ug/l) | <.002 | <.01 | <.003 | <.003 | |
| 10. | Calcium (mg/l) | 16 | 14 | 13 | 12 | 16 |
| 11. | Carbonate (mg/l) | <.1 | <.1 | <.1 | <.1 | <.1 |
| 12. | Cerium (mg/l) | <.002 | | <.003 | <.003 | |
| 13. | Chloride (mg/l) | 9.6 | 5.5 | <1 | 6.9 | 56 |
| 14. | Chrome, Hexavalent | <.01 | <.01 | <.01 | <.01 | |
| 15. | Cobalt (ug/l) | .001 | | .006 | .01 | |
| 16. | Conductivity, Specific (uʊ) | 980 | 940 | 980 | 980 | |
| 17. | Copper (ug/l) | .08 | <.1 | .1 | .06 | |
| 18. | Fluoride (mg/l) | 9.8 | 9.9 | 10.2 | 10 | 14 |
| 19. | Gallium (ug/l) | .002 | | <.003 | .003 | |
| 20. | Hardness, Total | 130 | 120 | 100 | 92 | |
| 21. | Hydroxide (mg/l) | <.1 | <.1 | <.1 | <.1 | |
| 22. | Iron (ug/l) | .01 | <.05 | .1 | .4 | |
| 23. | Lead (ug/l) | <.01 | <.05 | .01 | .03 | |
| 24. | Lithium (ug/l) | .4 | <.1 | 4 | .1 | |
| 25. | Magnesium (mg/l) | 22 | 20 | 17 | 15 | 11 |
| 26. | Manganese (ug/l) | .01 | <.05 | .03 | .04 | |
| 27. | Mercury (ug/l) | | | | | |
| 28. | Molybdenum (ug/l) | .02 | | .01 | .03 | |
| 29. | Nickel (ug/l) | .04 | | .02 | .02 | |
| 30. | Nitrate (mg/l) | <.1 | .2 | .9 | .5 | |
| 31. | pH | 8.0 | 8.0 | 7.9 | 7.9 | |
| 32. | Phosphate, Total | .1 | <.1 | <.1 | <.1 | |
| 33. | Potassium (mg/l) | | | | | <1 |
| 34. | Selenium (ug/l) | <.002 | <.01 | <.003 | (.08) | |
| 35. | Silica (mg/l) | 15 | 14 | 13 | 15 | 13 |
| (*)36. | Silver (ug/l) | <.002 | <.05 | <.003 | <.003 | |
| 37. | Sodium (mg/l) | 200 | 210 | 200 | 250 | 610 |
| 38. | Solids, Dissolved (mg/l) | 625 | 625 | 585 | 685 | 1580 |
| 39. | Strontium (ug/l) | 8 | | 2 | 2 | |
| 40. | Sulfate (mg/l) | 120 | 100 | 83 | 92 | 205 |
| 41. | Titanium (ug/l) | .1 | | .03 | .2 | |
| 42. | Vanadium (ug/l) | .004 | | .001 | .002 | |
| 43. | Yttrium (mg/l) | <.002 | | <.003 | <.003 | |
| 44. | Zinc (ug/l) | .01 | <.05 | .05 | .04 | |
| 45. | Zirconium (ug/l) | <.002 | | <.003 | <.003 | |
| 46. | Radioactivity | | | | | |
| | Gross Alpha (pcl) | 11 | | 0 | 9.7 | |
| | Radium 226* | 0 | | | .3 | |
| | Gross Beta (pcl) | 0 | | 0 | 0 | |
| | Thorium 230** | | | | | |
| | Uranium** | | | | | |
| 47. | Total Organic Carbon (TOC) If TOC >10 mgl/l then measure | | | | | |
| | Dissolved Organic Carbon | <1 | | <1 | <1 | |
| | Suspended Organic Carbon | | | | | |
| | Phenol | | | | | |
| | Sulfur, Acid Extract | | | | | |
| | Nitrogen, Base Extract | | | | | |

(*) Not required

* Required if gross alpha is greater than 4 picocuries per liter (pcl).

** Required if gross beta is greater than 100 picocuries per liter (pcl).

TABLE II B 4.3 (Continued)

WATER QUALITY ANALYSIS
DRILLING WATER

Well Number: SG-1

| | Depth at Which Sample Taken | 2525' | lower 1930 | | | |
|---|---|---|---|---|---|---|
| | Element Measured | | | | | |
| 1. | Aluminum (ug/l) | | .2 | | | |
| 2. | Ammonia (mg/l) | | 36 | | | |
| 3. | Arsenic (ug/l) | | .02 | | | |
| 4 | Barium (ug/l) | | .5 | | | |
| 5. | Beryllium (ug/l) | | .001 | | | |
| 6. | Bicarbonate (mg/l) | 1280 | 6110 | | | |
| 7. | Bismuth (ug/l) | | <.003 | | | |
| 8. | Boron (ug/l) | 2.0 | 3.3 | | | |
| 9. | Cadmium (ug/l) | | <.003 | | | |
| 10. | Calcium (mg/l) | 20 | 44 | | | |
| 11. | Carbonate (mg/l) | <.1 | 170 | | | |
| 12. | Cerium (mg/l) | | <.003 | | | |
| 13. | Chloride (mg/l) | 43 | 1330 | | | |
| 14. | Chrome, Hexavalent | | <.01 | | | |
| 15. | Cobalt (ug/l) | | .009 | | | |
| 16. | Conductivity, Specific (uv) | | 10,800 | | | |
| 17. | Copper (ug/l) | | .05 | | | |
| 18. | Fluoride (mg/l) | 14 | 10 | | | |
| 19. | Gallium (ug/l) | | .01 | | | |
| 20. | Hardness, Total | | 225 | | | |
| 21. | Hydroxide (mg/l) | | <.1 | | | |
| 22. | Iron (ug/l) | | .12 | | | |
| 23. | Lead (ug/l) | | .10 | | | |
| 24. | Lithium (ug/l) | | 12 | | | |
| 25. | Magnesium (mg/l) | 13 | 28 | | | |
| 26. | Manganese (ug/l) | | .07 | | | |
| 27. | Mercury (ug/l) | | | | | |
| 28. | Molybdenum (ug/l) | | .06 | | | |
| 29. | Nickel (ug/l) | | .1 | | | |
| 30. | Nitrate (mg/l) | | .1 | | | |
| 31. | pH | | 8.5 | | | |
| 32. | Phosphate, Total | | <.1 | | | |
| 33. | Potassium (mg/l) | <1 | | | | |
| 34. | Selenium (ug/l) | | <.003 | | | |
| 35. | Silica (mg/l) | 13 | 15 | | | |
| (*) 36. | Silver (ug/l) | | <.003 | | | |
| 37. | Sodium (mg/l) | 550 | 3390 | | | |
| 38. | Solids, Dissolved (mg/l) | 1435 | 8380 | | | |
| 39. | Strontium (ug/l) | | 5 | | | |
| 40. | Sulfate (mg/l) | 150 | 400 | | | |
| 41. | Titanium (ug/l) | | .2 | | | |
| 42. | Vanadium (ug/l) | | .06 | | | |
| 43. | Yttrium (mg/l) | | .002 | | | |
| 44. | Zinc (ug/l) | | .03 | | | |
| 45. | Zirconium (ug/l) | | .1 | | | |
| 46. | Radioactivity | | | | | |
| | Gross Alpha (pcl) | | | | | |
| | Radium 226* | | | | | |
| | Gross Beta (pcl) | | | | | |
| | Thorium 230** | | | | | |
| | Uranium** | | | | | |
| 47. | Total Organic Carbon (TOC) | | | | | |
| | If TOC > 10 mg/l then measure | | | | | |
| | Dissolved Organic Carbon | | | | | |
| | Suspended Organic Carbon | | | | | |
| | Phenols | | | | | |
| | Sulfur, - Acid Extract | | | | | |
| | Nitrogen, Base Extract | | | | | |

(*) Not required

* Required if gross alpha is greater than 4 picocuries per liter (pcl).

** Required if gross beta is greater than 100 picocuries per liter (pcl).

## TABLE II B 4.4

## WATER QUALITY ANALYSIS
## DRILLING WATER

Well Number: SG-20

|  | Depth at Which Sample Taken | 515' | 850' | 987' | 945' |  |
|---|---|---|---|---|---|---|
|  | Element Measured |  |  |  |  |  |
| 1. | Aluminum (ug/l) |  |  |  |  |  |
| 2. | Ammonia (mg/l) |  |  |  |  |  |
| 3. | Arsenic (ug/l) |  |  |  |  |  |
| 4 | Barium (ug/l) |  |  |  |  |  |
| 5. | Beryllium (ug/l) |  |  |  |  |  |
| 6. | Bicarbonate (mg/l) | 500 | 1380 | 1760 | 1911 |  |
| 7. | Bismuth (ug/l) |  |  |  |  |  |
| 8. | Boron (ug/l) | 0.1 | 2.5 | 1.4 |  |  |
| 9. | Cadmium (ug/l) |  |  |  |  |  |
| 10. | Calcium (mg/l) | 7.4 | 6.6 | 7.4 | 4.9 |  |
| 11. | Carbonate (mg/l) | <.1 | ≤.1 | ≤.1 | 24 |  |
| 12. | Cerium (mg/l) |  |  |  |  |  |
| 13. | Chloride (mg/l) | 4.2 | 9.8 | 9.8 | 13 |  |
| 14. | Chrome, Hexavalent |  |  |  |  |  |
| 15. | Cobalt (ug/l) |  |  |  |  |  |
| 16. | Conductivity, Specific (uv) |  |  |  |  |  |
| 17. | Copper (ug/l) |  |  |  |  |  |
| 18. | Fluoride (mg/l) | 3.6 | 19 | 24 | 23 |  |
| 19. | Gallium (ug/l) |  |  |  |  |  |
| 20. | Hardness, Total |  |  |  |  |  |
| 21. | Hydroxide (mg/l) |  |  |  |  |  |
| 22. | Iron (ug/l) |  |  |  |  |  |
| 23. | Lead (ug/l) |  |  |  |  |  |
| 24. | Lithium (ug/l) |  |  |  |  |  |
| 25. | Magnesium (mg/l) | 3.5 | 5.2 | 6.2 | 3.0 |  |
| 26. | Manganese (ug/l) |  |  |  |  |  |
| 27. | Mercury (ug/l) |  |  |  |  |  |
| 28. | Molybdenum (ug/l) |  |  |  |  |  |
| 29. | Nickel (ug/l) |  |  |  |  |  |
| 30. | Nitrate (mg/l) |  |  |  |  |  |
| 31. | pH |  |  |  | 8.4 |  |
| 32. | Phosphate, Total |  |  |  |  |  |
| 33. | Potassium (mg/l) | <1 | <1 | <1 | .9 |  |
| 34. | Selenium (ug/l) |  |  |  |  |  |
| 35. | Silica (mg/l) | 15 | 15 | 11 | 11 |  |
| (*)36. | Silver (ug/l) |  |  |  |  |  |
| 37. | Sodium (mg/l) | 190 | 530 | 680 | 780 |  |
| 38. | Solids, Dissolved (mg/l) | 525 | 1280 | 1605 |  |  |
| 39. | Strontium (ug/l) |  |  |  |  |  |
| 40. | Sulfate (mg/l) | 56 | 14 | <4 | <4 |  |
| 41. | Titanium (ug/l) |  |  |  |  |  |
| 42. | Vanadium (ug/l) |  |  |  |  |  |
| 43. | Yttrium (mg/l) |  |  |  |  |  |
| 44. | Zinc (ug/l) |  |  |  |  |  |
| 45. | Zirconium (ug/l) |  |  |  |  |  |
| 46. | Radioactivity<br>Gross Alpha (pcl) |  |  |  |  |  |
|  | Radium 226* |  |  |  |  |  |
|  | Gross Beta (pcl) |  |  |  |  |  |
|  | Thorium 230** |  |  |  |  |  |
|  | Uranium** |  |  |  |  |  |
| 47. | Total Organic Carbon (TOC)<br>If TOC >10 mgl/l then measure<br>Dissolved Organic Carbon |  |  |  |  |  |
|  | Suspended Organic Carbon |  |  |  |  |  |
|  | Phenols |  |  |  |  |  |
|  | Sulfur, Acid Extract |  |  |  |  |  |
|  | Nitrogen, Base Extract |  |  |  |  |  |

(*) Not required

* Required if gross alpha is greater than 4 picocuries per liter (pcl).

** Required if gross beta is greater than 100 picocuries per liter (pcl).

TABLE II B 4 5

## WATER QUALITY ANALYSIS
## DRILLING WATER

Well Number: SG-21

| | Depth at Which Sample Taken | 676' | 980' | 1035' | 1000-1035 | 950-1009' |
|---|---|---|---|---|---|---|
| | Element Measured | | | | | |
| 1. | Aluminum (ug/l) | | | | | |
| 2. | Ammonia (mg/l) | | | | | |
| 3. | Arsenic (ug/l) | | | | | |
| 4 | Barium (ug/l) | | | | | |
| 5. | Beryllium (ug/l) | | | | | |
| 6. | Bicarbonate (mg/l) | 422 | 530 | 360 | 500 | 470 |
| 7. | Bismuth (ug/l) | | | | | |
| 8. | Boron (ug/l) | | <.1 | .6 | .6 | .3 |
| 9. | Cadmium (ug/l) | | | | | |
| 10. | Calcium (mg/l) | 31 | 7.4 | 7.4 | 8.2 | 34 |
| 11. | Carbonate (mg/l) | 6 | 12 | 50 | <.1 | <.1 |
| 12. | Cerium (mg/l) | | | | | |
| 13. | Chloride (mg/l) | 3.2 | 5.6 | 82 | 1.4 | 7.0 |
| 14. | Chrome, Hexavalent | | | | | |
| 15. | Cobalt (ug/l) | | | | | |
| 16. | Conductivity, Specific (u℧) | 750 | | | | |
| 17. | Copper (ug/l) | | | | | |
| 18. | Fluoride (mg/l) | 1.4 | 16 | 16 | 16 | 4.9 |
| 19. | Gallium (ug/l) | | | | | |
| 20. | Hardness, Total | | | 32 | | |
| 21. | Hydroxide (mg/l) | | | | | |
| 22. | Iron (ug/l) | | | <.05 | | |
| 23. | Lead (ug/l) | | | | | |
| 24. | Lithium (ug/l) | | | | | |
| 25. | Magnesium (mg/l) | 26 | 3.8 | 3.3 | 7.2 | 33 |
| 26. | Manganese (ug/l) | | | | | |
| 27. | Mercury (ug/l) | | | | | |
| 28. | Molybdenum (ug/l) | | | | | |
| 29. | Nickel (ug/l) | | | | | |
| 30. | Nitrate (mg/l) | | | <.1 | | |
| 31. | pH | 8.4 | | 8.5 | | |
| 32. | Phosphate, Total | | | <.1 | | |
| 33. | Potassium (mg/l) | .4 | <1 | | <1 | <1 |
| 34. | Selenium (ug/l) | | | | | |
| 35. | Silica (mg/l) | 23 | 18 | 12 | 13 | 19 |
| (*)36. | Silver (ug/l) | | | | | |
| 37. | Sodium (mg/l) | 160 | 230 | 240 | 400 | 135 |
| 38. | Solids, Dissolved (mg/l) | 581 | 555 | 610 | 1150 | 590 |
| 39. | Strontium (ug/l) | | | | | |
| 40. | Sulfate (mg/l) | 124 | <1 | 18 | 455 | 125 |
| 41. | Titanium (ug/l) | | | | | |
| 42. | Vanadium (ug/l) | | | | | |
| 43. | Yttrium (mg/l) | | | | | |
| 44. | Zinc (ug/l) | | | | | |
| 45. | Zirconium (ug/l) | | | | | |
| 46. | Radioactivity | | | | | |
| | Gross Alpha (pcl) | | | | | |
| | Radium 226* | | | | | |
| | Gross Beta (pcl) | | | | | |
| | Thorium 230** | | | | | |
| | Uranium** | | | | | |
| 47. | Total Organic Carbon (TOC) | | | | | |
| | If TOC > 10 mgl/l then measure | | | | | |
| | Dissolved Organic Carbon | | | | | |
| | Suspended Organic Carbon | | | | | |
| | Phenol | | | | | |
| | Sulfur, Acid Extract | | | | | |
| | Nitrogen, Base Extract | | | | | |

(*) Not required

* Required if gross alpha is greater than 4 picocuries per liter (pcl).

** Required if gross beta is greater than 100 picocuries per liter (pcl).

## TABLE II B-4.6

## WATER QUALITY ANALYSIS
## DRILLING WATER

Well Number: SG-8

| | Depth at Which Sample Taken | 600' | 971' | 1013' | 2117' | 2608' |
|---|---|---|---|---|---|---|
| | Element Measured | | | | | |
| 1. | Aluminum (ug/1) | .1 | .2 | | | |
| 2. | Ammonia (mg/1) | .3 | 1.1 | | | |
| 3. | Arsenic (ug/1) | .004 | .05 | | | |
| 4 | Barium (ug/1) | .03 | .2 | | | |
| 5. | Beryllium (ug/1) | <.004 | <.002 | | | |
| 6. | Bicarbonate (mg/1) | 510 | 1010 | 932 | 1632 | 1808 |
| 7. | Bismuth (ug/1) | <.004 | <.002 | | | |
| 8. | Boron (ug/1) | 2.5 | 1 | 2.8 | | |
| 9. | Cadmium (ug/1) | <.004 | <.002 | | | |
| 10. | Calcium (mg/1) | 23 | 6.6 | 8.3 | 4.5 | 3.3 |
| 11. | Carbonate (mg/1) | <.1 | <.1 | 48 | 55 | 42 |
| 12. | Cerium (mg/1) | <.004 | <.002 | | | |
| 13. | Chloride (mg/1) | 6.9 | 6.9 | 3 | 18 | 19 |
| 14. | Chrome, Hexavalent | <.01 | <.01 | | | |
| 15. | Cobalt (ug/1) | <.004 | | | | |
| 16. | Conductivity, Specific (uv) | 990 | 1650 | 1460 | 2300 | 2300 |
| 17. | Copper (ug/1) | <.1 | .04 | | | |
| 18. | Fluoride (mg/1) | 9.2 | 12 | 19 | 20 | 21 |
| 19. | Gallium (ug/1) | <.004 | <.002 | | | |
| 20. | Hardness, Total | 190 | 48 | | | |
| 21. | Hydroxide (mg/1) | <.1 | <.1 | | | |
| 22. | Iron (ug/1) | .05 | .06 | | | |
| 23. | Lead (ug/1) | <.02 | <.01 | | | |
| 24. | Lithium (ug/1) | .3 | 3 | .05 | | |
| 25. | Magnesium (mg/1) | 33 | 7.7 | 4.5 | 2.6 | 1.5 |
| 26. | Manganese (ug/1) | .009 | .01 | | | |
| 27. | Mercury (ug/1) | | | | | |
| 28. | Molybdenum (ug/1) | .02 | .02 | | | |
| 29. | Nickel (ug/1) | .007 | .04 | | | |
| 30. | Nitrate (mg/1) | .6 | .3 | | | |
| 31. | pH | 8.1 | 8.1 | 9.3 | 8.9 | 8.8 |
| 32. | Phosphate, Total | <.1 | <.1 | | | |
| 33. | Potassium (mg/1) | .4 | .6 | .7 | 1.8 | .9 |
| 34. | Selenium (ug/1) | <.004 | .003 | | | |
| 35. | Silica (mg/1) | 19 | 11 | 11 | 13 | 14 |
| (*)36. | Silver (ug/1) | <.004 | .004 | | | |
| 37. | Sodium (mg/1) | 170 | 350 | 459 | 724 | 784 |
| 38. | Solids, Dissolved (mg/1) | 600 | 940 | 1020 | 1662 | 1786 |
| 39. | Strontium (ug/1) | .7 | 2 | | | |
| 40. | Sulfate (mg/1) | 85 | <4 | 6 | 23 | 14 |
| 41. | Titanium (ug/1) | .1 | .2 | | | |
| 42. | Vanadium (ug/1) | <.004 | <.001 | | | |
| 43. | Yttrium (mg/1) | <.004 | <.002 | | | |
| 44. | Zinc (ug/1) | .01 | .02 | | | |
| 45. | Zirconium (ug/1) | <.004 | <.002 | | | |
| 46. | Radioactivity | | | | | |
| | Gross Alpha (pcl) | 2.6 | .8 | | | |
| | Radium 226* | | | | | |
| | Gross Beta (pcl) | 0 | 0 | | | |
| | Thorium 230** | | | | | |
| | Uranium** | | | | | |
| 47. | Total Organic Carbon (TOC) If TOC >10 mgl/1 then measure | | | | | |
| | Dissolved Organic Carbon | <1 | <1 | | | |
| | Suspended Organic Carbon | | | | | |
| | Phenols | | | | | |
| | Sulfur, Acid Extract | | | | | |
| | Nitrogen, Base Extract | | | | | |

(*) Not required

* Required if gross alpha is greater than 4 picocuries per liter (pcl).

** Required if gross beta is greater than 100 picocuries per liter (pcl).

a. Upper zone jetted sample

b. Lower zone jetted sample - total depth open hole

## TABLE II B-4.6 (Continued)

## WATER QUALITY ANALYSIS
## DRILLING WATER

Well Number: SG-8

| | Depth at Which Sample Taken | [b]1910' | [a]950' | | | |
|---|---|---|---|---|---|---|
| | Element Measured | | | | | |
| 1. | Aluminum (ug/l) | .2 | .2 | | | |
| 2. | Ammonia (mg/l) | 21 | 3.3 | | | |
| 3. | Arsenic (ug/l) | .03 | .03 | | | |
| 4 | Barium (ug/l) | 2 | .7 | | | |
| 5. | Beryllium (ug/l) | < .001 | < .001 | | | |
| 6. | Bicarbonate (mg/l) | 5210 | 1740 | | | |
| 7. | Bismuth (ug/l) | < .004 | < .004 | | | |
| 8. | Boron (ug/l) | < 35 | 3.6 | | | |
| 9. | Cadmium (ug/l) | .04 | < .004 | | | |
| 10. | Calcium (mg/l) | 12 | 12 | | | |
| 11. | Carbonate (mg/l) | 96 | 72 | | | |
| 12. | Cerium (mg/l) | < .004 | < .004 | | | |
| 13. | Chloride (mg/l) | 840 | 55 | | | |
| 14. | Chrome, Hexavalent | < .05 | < .05 | | | |
| 15. | Cobalt (ug/l) | < .01 | < .02 | | | |
| 16. | Conductivity, Specific (uv) | 9200 | 2500 | | | |
| 17. | Copper (ug/l) | .02 | .02 | | | |
| 18. | Fluoride (mg/l) | 20 | 12 | | | |
| 19. | Gallium (ug/l) | .004 | .01 | | | |
| 20. | Hardness, Total | 36 | 80 | | | |
| 21. | Hydroxide (mg/l) | < .1 | < .1 | | | |
| 22. | Iron (ug/l) | .34 | .31 | | | |
| 23. | Lead (ug/l) | .02 | < .02 | | | |
| 24. | Lithium (ug/l) | 6.6 | .6 | | | |
| 25. | Magnesium (mg/l) | 1.5 | 12 | | | |
| 26. | Manganese (ug/l) | .09 | .004 | | | |
| 27. | Mercury (ug/l) | < .01 | < .01 | | | |
| 28. | Molybdenum (ug/l) | .03 | .03 | | | |
| 29. | Nickel (ug/l) | .2 | .03 | | | |
| 30. | Nitrate (mg/l) | .3 | 0.2 | | | |
| 31. | pH | 8.4 | 8.5 | | | |
| 32. | Phosphate, Total | < .1 | < .1 | | | |
| 33. | Potassium (mg/l) | 14 | 1.3 | | | |
| 34. | Selenium (ug/l) | < .004 | < .004 | | | |
| 35. | Silica (mg/l) | 17 | 12 | | | |
| (*)36. | Silver (ug/l) | < .004 | < .004 | | | |
| 37. | Sodium (mg/l) | 2600 | 690 | | | |
| 38. | Solids, Dissolved (mg/l) | 6130 | 1670 | | | |
| 39. | Strontium (ug/l) | 1 | .7 | | | |
| 40. | Sulfate (mg/l) | 3.0 | 2.5 | | | |
| 41. | Titanium (ug/l) | .1 | .05 | | | |
| 42. | Vanadium (ug/l) | .01 | .01 | | | |
| 43. | Yttrium (mg/l) | .002 | < .004 | | | |
| 44. | Zinc (ug/l) | .1 | .3 | | | |
| 45. | Zirconium (ug/l) | .03 | .006 | | | |
| 46. | Radioactivity | | | | | |
| | Gross Alpha (pCl) | 24 | 2.1 | | | |
| | Radium 226* | | | | | |
| | Gross Beta (pCl) | 0 | 0 | | | |
| | Thorium 230** | | | | | |
| | Uranium** | | | | | |
| 47. | Total Organic Carbon (TOC)<br>If TOC > 10 mgl/l then measure- | | | | | |
| | Dissolved Organic Carbon | 3 | < 1 | | | |
| | Suspended Organic Carbon | | | | | |
| | Phenol | | | | | |
| | Sulfur, Acid Extract | | | | | |
| | Nitrogen, Base Extract | | | | | |

(*) Not required

* Required if gross alpha is greater than 4 picocuries per liter (pCl).

** Required if gross beta is greater than 100 picocuries per liter (pCl).

a. Upper zone jetted sample

b. Lower zone jetted sample - total depth open hole

TABLE II B 4.7

## WATER QUALITY ANALYSIS
## DRILLING WATER

Well Number: SG-17

| | Sample Number | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| | Sampling Depth | 788'-808' | 859' | 822'-869' | 866'-919 | 919'-970' |
| | Element Measured | | | | | |
| 1. | Aluminum (ug/l) | .15 | .15 | .25 | | |
| 2. | Ammonia (mg/l) | .5 | .5 | .7 | | |
| 3. | Arsenic (ug/l) | .008 | <.01 | <.01 | | |
| 4 | Barium (ug/l) | .03 | <1 | <1 | | |
| 5. | Beryllium (ug/l) | .003 | | | | |
| 6. | Bicarbonate (mg/l) | 430 | 440 | 490 | 495 | 533 |
| 7. | Bismuth (ug/l) | <.003 | | | | |
| 8. | Boron (ug/l) | 2.3 | 2.7 | 2.3 | | |
| 9. | Cadmium (ug/l) | <.003 | <.01 | <.01 | | |
| 10. | Calcium (mg/l) | 4.9 | 4.5 | 5.3 | 3.2 | 10 |
| 11. | Carbonate (mg/l) | <.1 | <.1 | <.1 | 10 | 0 |
| 12. | Cerium (mg/l) | <.003 | | | | |
| 13. | Chloride (mg/l) | <1 | 6.9 | 6.9 | 2.3 | 4.1 |
| 14. | Chrome, Hexavalent | <.01 | <.01 | <.01 | | |
| 15. | Cobalt (ug/l) | .004 | | | | |
| 16. | Conductivity, Specific (u℧) | 680 | 730 | 800 | 700 | 770 |
| 17. | Copper (ug/l) | .2 | <.1 | <.1 | | |
| 18. | Fluoride (mg/l) | 10 | 10 | 11 | 15.3 | 13.5 |
| 19. | Gallium (ug/l) | .003 | | | | |
| 20. | Hardness, Total | 18 | 20 | 21 | | |
| 21. | Hydroxide (mg/l) | <.1 | <.1 | <.1 | | |
| 22. | Iron (ug/l) | .63 | 1.4 | 1.5 | | |
| 23. | Lead (ug/l) | .22 | <.05 | .18 | | |
| 24. | Lithium (ug/l) | .8 | <.5 | <.5 | | |
| 25. | Magnesium (mg/l) | .7 | 2.1 | 1.9 | 2.7 | 6 |
| 26. | Manganese (ug/l) | .2 | <.05 | <.05 | | |
| 27. | Mercury (ug/l) | | | | | |
| 28. | Molybdenum (ug/l) | .03 | | | | |
| 29. | Nickel (ug/l) | .03 | | | | |
| 30. | Nitrate (mg/l) | 1.9 | .4 | <.1 | | |
| 31. | pH | 7.9 | 8.2 | 7.9 | 8.6 | 8.2 |
| 32. | Phosphate, Total | <.1 | <.1 | .2 | | |
| 33. | Potassium (mg/l) | | | | .4 | 1.1 |
| 34. | Selenium (ug/l) | .2 | <.01 | <.01 | | |
| 35. | Silica (mg/l) | 16 | 17 | 14 | 13 | 11 |
| (*)36. | Silver (ug/l) | <.003 | <.05 | <.05 | | |
| 37. | Sodium (mg/l) | 180 | 180 | 200 | 214 | 211 |
| 38. | Solids, Dissolved (mg/l) | 420 | 440 | 500 | 503 | 564 |
| 39. | Strontium (ug/l) | .3 | | | | |
| 40. | Sulfate (mg/l) | <4 | <4 | <4 | <4 | 4.6 |
| 41. | Titanium (ug/l) | .1 | | | | |
| 42. | Vanadium (ug/l) | .002 | | | | |
| 43. | Yttrium (mg/l) | <.003 | | | | |
| 44. | Zinc (ug/l) | .4 | <.5 | <.5 | | |
| 45. | Zirconium (ug/l) | <.003 | | | | |
| 46. | Radioactivity | | | | | |
| | Gross Alpha (pcl) | 1.3 | | | | |
| | Radium 226* | | | | | |
| | Gross Beta (pcl) | 0 | | | | |
| | Thorium 230** | | | | | |
| | Uranium** | | | | | |
| 47. | Total Organic Carbon (TOC) | | | | | |
| | If TOC > 10 mgl/l then measure | | | | | |
| | Dissolved Organic Carbon | 6 | | | | |
| | Suspended Organic Carbon | | | | | |
| | Phenols | | | | | |
| | Sulfur, Acid Extract | | | | | |
| | Nitrogen, Base Extract | | | | | |

(*) Not required

* Required if gross alpha is greater than 4 picocuries per liter (pcl).

** Required if gross beta is greater than 100 picocuries per liter (pcl).

TABLE II B 4.7 (Continued)

## WATER QUALITY ANALYSIS
## DRILLING WATER

**Well Number:** SG-17

| | Sample Number | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|
| | Sampling Depth | 970'-1017' | 1015'-1062 | 1066-1117 | 1115-1166 | 1180' |
| | Element Measured | | | | | |
| 1. | Aluminum (ug/l) | <.1 | 7 | .7 | | |
| 2. | Ammonia (mg/l) | .7 | .9 | .2 | | |
| 3. | Arsenic (ug/l) | <.01 | .1 | .02 | | |
| 4 | Barium (ug/l) | <1 | .02 | .03 | | |
| 5. | Beryllium (ug/l) | | <.002 | < .001 | | |
| 6. | Bicarbonate (mg/l) | 620 | 580 | 615 | 711 | 510 |
| 7. | Bismuth (ug/l) | | <.002 | <.002 | | |
| 8. | Boron (ug/l) | 2.0 | 1.2 | 1.4 | | <0.1 |
| 9. | Cadmium (ug/l) | <.01 | < .002 | <.002 | | |
| 10. | Calcium (mg/l) | 3.3 | 3.7 | 4.9 | 2.2 | 8.2 |
| 11. | Carbonate (mg/l) | <.1 | <.1 | 72 | 16 | 66 |
| 12. | Cerium (mg/l) | | <.002 | <.002 | | |
| 13. | Chloride (mg/l) | 4.1 | 4.1 | 28 | 2.3 | <4 |
| 14. | Chrome, Hexavalent | <.01 | <.01 | <.01 | | |
| 15. | Cobalt (ug/l) | | .001 | .008 | | |
| 16. | Conductivity, Specific (u℧) | 950 | 910 | 920 | 1000 | |
| 17. | Copper (ug/l) | <.1 | .2 | .08 | | |
| 18. | Fluoride (mg/l) | 12 | 12 | 16 | 16 | 10 |
| 19. | Gallium (ug/l) | | .002 | <.002 | | |
| 20. | Hardness, Total | 19 | 18 | 26 | | |
| 21. | Hydroxide (mg/l) | <.1 | <.1 | <.1 | | |
| 22. | Iron (ug/l) | .54 | .38 | .5 | | |
| 23. | Lead (ug/l) | .08 | .02 | .3 | | |
| 24. | Lithium (ug/l) | <.5 | <.5 | .01 | | |
| 25. | Magnesium (mg/l) | 2.6 | 2.1 | 5.3 | 2.1 | 8.2 |
| 26. | Manganese (ug/l) | <.05 | .1 | .06 | | |
| 27. | Mercury (ug/l) | | | | | |
| 28. | Molybdenum (ug/l) | | .02 | .02 | | |
| 29. | Nickel (ug/l) | | .002 | .008 | | |
| 30. | Nitrate (mg/l) | <.1 | 1.9 | .1 | | |
| 31. | pH | 8.1 | 8.1 | 8.3 | 8.8 | |
| 32. | Phosphate, Total | <.1 | <.1 | .1 | | |
| 33. | Potassium (mg/l) | | | .4 | .5 | <1 |
| 34. | Selenium (ug/l) | <.01 | .1 | .03 | | |
| 35. | Silica (mg/l) | 14 | 13 | 13 | 9 | 14 |
| (*)36. | Silver (ug/l) | <.05 | <.002 | <.002 | | |
| 37. | Sodium (mg/l) | 250 | 220 | 315 | 303 | 245 |
| 38. | Solids, Dissolved (mg/l) | 600 | 540 | 750 | 704 | 600 |
| 39. | Strontium (ug/l) | | .09 | .4 | | |
| 40. | Sulfate (mg/l) | <4 | <4 | <4 | 5 | <4 |
| 41. | Titanium (ug/l) | | .07 | .3 | | |
| 42. | Vanadium (ug/l) | | <.001 | <.001 | | |
| 43. | Yttrium (mg/l) | | <.002 | <.002 | | |
| 44. | Zinc (ug/l) | .7 | .2 | .2 | | |
| 45. | Zirconium (ug/l) | | <.002 | <.002 | | |
| 46. | Radioactivity | | | | | |
| | Gross Alpha (pcl) | | 4.5 | 1.7 | | |
| | Radium 226* | | .3 | | | |
| | Gross Beta (pcl) | | 0 | 15 | | |
| | Thorium 230** | | | | | |
| | Uranium** | | | | | |
| 47. | Total Organic Carbon (TOC)<br>If TOC >10 mgl/l then measure | | | | | |
| | Dissolved Organic Carbon | | <1 | 2 | | |
| | Suspended Organic Carbon | | | | | |
| | Phenols | | | | | |
| | Sulfur, Acid Extract | | | | | |
| | Nitrogen, Base Extract | | | | | |

(*) Not required

* Required if gross alpha is greater than 4 picocuries per liter (pcl).

** Required if gross beta is greater than 100 picocuries per liter (pcl).

TABLE II B 4.7 (Continued)

## WATER QUALITY ANALYSIS
## DRILLING WATER

Well Number: SG-17

| | Sample Number | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|
| | Sampling Depth | 1164-1212 | 1200-1224 | 1224-1250' | 1250-127 | 1289-1309 |
| | Element Measured | | | | | |
| 1. | Aluminum (ug/l) | | | | | |
| 2. | Ammonia (mg/l) | | | | | |
| 3. | Arsenic (ug/l) | | | | | |
| 4 | Barium (ug/l) | | | | | |
| 5. | Beryllium (ug/l) | | | | | |
| 6. | Bicarbonate (mg/l) | 960 | 945 | 805 | 710 | 700 |
| 7. | Bismuth (ug/l) | | | | | |
| 8. | Boron (ug/l) | .03 | 0.4 | 1.0 | 0.2 | 1.8 |
| 9. | Cadmium (ug/l) | | | | | |
| 10. | Calcium (mg/l) | 5.7 | 9.0 | 22 | 9.0 | 7.4 |
| 11. | Carbonate (mg/l) | 78 | 60 | 36 | 72 | <.1 |
| 12. | Cerium (mg/l) | | | | | |
| 13. | Chloride (mg/l) | <4 | <4 | <4 | <4 | 9.7 |
| 14. | Chrome, Hexavalent | | | | | |
| 15. | Cobalt (ug/l) | | | | | |
| 16. | Conductivity, Specific (u℧) | | | | | |
| 17. | Copper (ug/l) | | | | | |
| 18. | Fluoride (mg/l) | 10 | 10 | 10 | 10 | 18 |
| 19. | Gallium (ug/l) | | | | | |
| 20. | Hardness, Total | | | | | |
| 21. | Hydroxide (mg/l) | | | | | |
| 22. | Iron (ug/l) | | | | | |
| 23. | Lead (ug/l) | | | | | |
| 24. | Lithium (ug/l) | | | | | |
| 25. | Magnesium (mg/l) | 5.8 | 4.3 | 3.6 | 2.8 | 5.3 |
| 26. | Manganese (ug/l) | | | | | |
| 27. | Mercury (ug/l) | | | | | |
| 28. | Molybdenum (ug/l) | | | | | |
| 29. | Nickel (ug/l) | | | | | |
| 30. | Nitrate (mg/l) | | | | | |
| 31. | pH | | | | | |
| 32. | Phosphate, Total | | | | | |
| 33. | Potassium (mg/l) | <1 | <1 | <1 | <1 | <1 |
| 34. | Selenium (ug/l) | | | | | |
| 35. | Silica (mg/l) | 12 | 12 | 11 | 13 | 12 |
| (*)36. | Silver (ug/l) | | | | | |
| 37. | Sodium (mg/l) | 410 | 420 | 370 | 340 | 280 |
| 38. | Solids, Dissolved (mg/l) | 995 | 980 | 955 | 800 | 680 |
| 39. | Strontium (ug/l) | | | | | |
| 40. | Sulfate (mg/l) | <4 | <4 | 105 | <4 | <4 |
| 41. | Titanium (ug/l) | | | | | |
| 42. | Vanadium (ug/l) | | | | | |
| 43. | Yttrium (mg/l) | | | | | |
| 44. | Zinc (ug/l) | | | | | |
| 45. | Zirconium (ug/l) | | | | | |
| 46. | Radioactivity | | | | | |
| | Gross Alpha (pcl) | | | | | |
| | Radium 226* | | | | | |
| | Gross Beta (pcl) | | | | | |
| | Thorium 230** | | | | | |
| | Uranium** | | | | | |
| 47. | Total Organic Carbon (TOC) | | | | | |
| | If TOC > 10 mgl/l then measure | | | | | |
| | Dissolved Organic Carbon | | | | | |
| | Suspended Organic Carbon | | | | | |
| | Phenols | | | | | |
| | Sulfur, Acid Extract | | | | | |
| | Nitrogen, Base Extract | | | | | |

(*) Not required

* Required if gross alpha is greater than 4 picocuries per liter (pcl).

** Required if gross beta is greater than 100 picocuries per liter (pcl).

## TABLE II B 4.7 (Continued)

## WATER QUALITY ANALYSIS
## DRILLING WATER

Well Number: SG-17

| | Sample Number | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|
| | Sampling Depth | 1329-1374 | 1374-1419 | 1423-1470 | 1473-152 | 1514-1572 |
| | Element Measured | | | | | |
| 1. | Aluminum (ug/l) | | | | | |
| 2. | Ammonia (mg/l) | | | | | |
| 3. | Arsenic (ug/l) | | | | | |
| 4 | Barium (ug/l) | | | | | |
| 5. | Beryllium (ug/l) | | | | | |
| 6. | Bicarbonate (mg/l) | 740 | 670 | 587 | 630 | 740 |
| 7. | Bismuth (ug/l) | | | | | |
| 8. | Boron (ug/l) | 0.1 | 1.0 | | .3 | .2 |
| 9. | Cadmium (ug/l) | | | | | |
| 10. | Calcium (mg/l) | 8.2 | 5.7 | 4 | 4.1 | 4.1 |
| 11. | Carbonate (mg/l) | 36 | <.1 | 8 | <.1 | <.1 |
| 12. | Cerium (mg/l) | | | | | |
| 13. | Chloride (mg/l) | <4 | 6.9 | 4 | 7.0 | 13 |
| 14. | Chrome, Hexavalent | | | | | |
| 15. | Cobalt (ug/l) | | | | | |
| 16. | Conductivity, Specific (u℧) | | | 800 | | |
| 17. | Copper (ug/l) | | | | | |
| 18. | Fluoride (mg/l) | 10 | 19 | 17 | 20 | 20 |
| 19. | Gallium (ug/l) | | | | | |
| 20. | Hardness, Total | | | | | |
| 21. | Hydroxide (mg/l) | | | | | |
| 22. | Iron (ug/l) | | | | | |
| 23. | Lead (ug/l) | | | | | |
| 24. | Lithium (ug/l) | | | | | |
| 25. | Magnesium (mg/l) | 3.3 | 4.5 | 3 | 3.7 | 4.9 |
| 26. | Manganese (ug/l) | | | | | |
| 27. | Mercury (ug/l) | | | | | |
| 28. | Molybdenum (ug/l) | | | | | |
| 29. | Nickel (ug/l) | | | | | |
| 30. | Nitrate (mg/l) | | | | | |
| 31. | pH | | | 8.4 | | |
| 32. | Phosphate, Total | | | | | |
| 33. | Potassium (mg/l) | <1 | <1 | 1 | <1 | <1 |
| 34. | Selenium (ug/l) | | | | | |
| 35. | Silica (mg/l) | 13 | 16 | 16 | 16 | 17 |
| (*)36. | Silver (ug/l) | | | | | |
| 37. | Sodium (mg/l) | 300 | 260 | 240 | 250 | 300 |
| 38. | Solids, Dissolved (mg/l) | 735 | 645 | 581 | 610 | 720 |
| 39. | Strontium (ug/l) | | | | | |
| 40. | Sulfate (mg/l) | <4 | <4 | <4 | <4 | <4 |
| 41. | Titanium (ug/l) | | | | | |
| 42. | Vanadium (ug/l) | | | | | |
| 43. | Yttrium (mg/l) | | | | | |
| 44. | Zinc (ug/l) | | | | | |
| 45. | Zirconium (ug/l) | | | | | |
| 46. | Radioactivity | | | | | |
| | Gross Alpha (pcl) | | | | | |
| | Radium 226* | | | | | |
| | Gross Beta (pcl) | | | | | |
| | Thorium 230** | | | | | |
| | Uranium** | | | | | |
| 47. | Total Organic Carbon (TOC) | | | | | |
| | If TOC > 10 mgl/l then measure | | | | | |
| | Dissolved Organic Carbon | | | | | |
| | Suspended Organic Carbon | | | | | |
| | Phenols | | | | | |
| | Sulfur, Acid Extract | | | | | |
| | Nitrogen, Base Extract | | | | | |

(*) Not required

* Required if gross alpha is greater than 4 picocuries per liter (pcl).

** Required if gross beta is greater than 100 picocuries per liter (pcl).

TABLE II B 4.7 (Continued)

## WATER QUALITY ANALYSIS
## DRILLING WATER

Well Number: SG-17

| | Sample Number | 21 | 22 | 23 | 24 | 25 |
|---|---|---|---|---|---|---|
| | Sampling Depth | 1561-1622 | 1618-1670 | 1622 | 1668-1720 | 1711-1770 |
| | Element Measured | | | | | |
| 1. | Aluminum (ug/l) | | | | | |
| 2. | Ammonia (mg/l) | | | | | |
| 3. | Arsenic (ug/l) | | | | | |
| 4 | Barium (ug/l) | | | | | |
| 5. | Beryllium (ug/l) | | | | | |
| 6. | Bicarbonate (mg/l) | 830 | 1110 | 700 | 1500 | 2170 |
| 7. | Bismuth (ug/l) | | | | | |
| 8. | Boron (ug/l) | .5 | 1.4 | .8 | 1.1 | 1.1 |
| 9. | Cadmium (ug/l) | | | | | |
| 10. | Calcium (mg/l) | 4.9 | 5.7 | 6.6 | 4.9 | 8.2 |
| 11. | Carbonate (mg/l) | <.1 | 46 | <.1 | <.1 | 81 |
| 12. | Cerium (mg/l) | | | | | |
| 13. | Chloride (mg/l) | 14 | 18 | 2.8 | 20 | 34 |
| 14. | Chrome, Hexavalent | | | | | |
| 15. | Cobalt (ug/l) | | | | | |
| 16. | Conductivity, Specific (u℧) | | | | | |
| 17. | Copper (ug/l) | | | | | |
| 18. | Fluoride (mg/l) | 20 | 25 | 20 | 24 | 25 |
| 19. | Gallium (ug/l) | | | | | |
| 20. | Hardness, Total | | | | | |
| 21. | Hydroxide (mg/l) | | | | | |
| 22. | Iron (ug/l) | | | | | |
| 23. | Lead (ug/l) | | | | | |
| 24. | Lithium (ug/l) | | | | | |
| 25. | Magnesium (mg/l) | 8.0 | 4.3 | 2.8 | 6.8 | 3.3 |
| 26. | Manganese (ug/l) | | | | | |
| 27. | Mercury (ug/l) | | | | | |
| 28. | Molybdenum (ug/l) | | | | | |
| 29. | Nickel (ug/l) | | | | | |
| 30. | Nitrate (mg/l) | | | | | |
| 31. | pH | | | | | |
| 32. | Phosphate, Total | | | | | |
| 33. | Potassium (mg/l) | <1 | <1 | <1 | <1 | <1 |
| 34. | Selenium (ug/l) | | | | | |
| 35. | Silica (mg/l) | 17 | 21 | 15 | 17 | 15 |
| (*)36. | Silver (ug/l) | | | | | |
| 37. | Sodium (mg/l) | 325 | 480 | 280 | 590 | 940 |
| 38. | Solids, Dissolved (mg/l) | 800 | 1150 | 670 | 1400 | 2175 |
| 39. | Strontium (ug/l) | | | | | |
| 40. | Sulfate (mg/l) | <4 | 4 | <4 | <4 | <4 |
| 41. | Titanium (ug/l) | | | | | |
| 42. | Vanadium (ug/l) | | | | | |
| 43. | Yttrium (mg/l) | | | | | |
| 44. | Zinc (ug/l) | | | | | |
| 45. | Zirconium (ug/l) | | | | | |
| 46. | Radioactivity | | | | | |
| | Gross Alpha (pcl) | | | | | |
| | Radium 226* | | | | | |
| | Gross Beta (pcl) | | | | | |
| | Thorium 230** | | | | | |
| | Uranium** | | | | | |
| 47. | Total Organic Carbon (TOC)<br>If TOC >10 mgl/l then measure<br>Dissolved Organic Carbon | | | | | |
| | Suspended Organic Carbon | | | | | |
| | Phenols | | | | | |
| | Sulfur, Acid Extract | | | | | |
| | Nitrogen, Base Extract | | | | | |

(*) Not required

* Required if gross alpha is greater than 4 picocuries per liter (pcl).

** Required if gross beta is greater than 100 picocuries per liter (pcl).

TABLE II B 4.7 (Continued)

WATER QUALITY ANALYSIS
DRILLING WATER

Well Number: SG-17

| | | | | | | |
|---|---|---|---|---|---|---|
| | Sample Number | 26 | 27 | 28 | 29 | 30 |
| | Sampling Depth | 1768-1820 | 1818-1870 | 1869-1920 | 1918-197 | 2120-2170 |
| | Element Measured | | | | | |
| 1. | Aluminum (ug/l) | | | | | .9 |
| 2. | Ammonia (mg/l) | | | | | 137 |
| 3. | Arsenic (ug/l) | | | | | .1 |
| 4 | Barium (ug/l) | | | | | 4.5 |
| 5. | Beryllium (ug/l) | | | | | .003 |
| 6. | Bicarbonate (mg/l) | 2460 | 620 | 1200 | 1850 | 17,300 |
| 7. | Bismuth (ug/l) | | | | | <.006 |
| 8. | Boron (ug/l) | 1.5 | .9 | 1.8 | .9 | 47 |
| 9. | Cadmium (ug/l) | | | | | <.006 |
| 10. | Calcium (mg/l) | 7.4 | 4.9 | 10 | 16 | <1 |
| 11. | Carbonate (mg/l) | <.1 | <.1 | 120 | 360 | 2930 |
| 12. | Cerium (mg/l) | | | | | ≤.04 |
| 13. | Chloride (mg/l) | 29 | 5.6 | 22 | 36 | 7740 |
| 14. | Chrome, Hexavalent | | | | | <.01 |
| 15. | Cobalt (ug/l) | | | | | .02 |
| 16. | Conductivity, Specific (u℧) | | | | | 58,000 |
| 17. | Copper (ug/l) | | | | | .03 |
| 18. | Fluoride (mg/l) | 24 | 8.9 | 20 | 45 | 40 |
| 19. | Gallium (ug/l) | | | | | ≤.06 |
| 20. | Hardness, Total | | | 42 | 52 | |
| 21. | Hydroxide (mg/l) | | | | | |
| 22. | Iron (ug/l) | | | <.05 | .08 | 3.6 |
| 23. | Lead (ug/l) | | | | | .81 |
| 24. | Lithium (ug/l) | | | | | 100 |
| 25. | Magnesium (mg/l) | 3.3 | 3.4 | 4.1 | 2.9 | 14 |
| 26. | Manganese (ug/l) | | | | | .3 |
| 27. | Mercury (ug/l) | | | | | .0001 |
| 28. | Molybdenum (ug/l) | | | | | .04 |
| 29. | Nickel (ug/l) | | | | | |
| 30. | Nitrate (mg/l) | | | <.1 | <.1 | 1260 |
| 31. | pH | | | 8.4 | 8.9 | 8.3 |
| 32. | Phosphate, Total | | | <.1 | <.1 | <.1 |
| 33. | Potassium (mg/l) | <1 | <1 | | | |
| 34. | Selenium (ug/l) | | | | | <.006 |
| 35. | Silica (mg/l) | 14 | 15 | 12 | 16 | 22 |
| (*)36. | Silver (ug/l) | | | | | <.006 |
| 37. | Sodium (mg/l) | 960 | 250 | 590 | 1100 | 14,000 |
| 38. | Solids, Dissolved (mg/l) | 2250 | 595 | 1480 | 2590 | 34,400 |
| 39. | Strontium (ug/l) | | | | | 3 |
| 40. | Sulfate (mg/l) | <4 | <4 | 98 | 82 | <4 |
| 41. | Titanium (ug/l) | | | | | .09 |
| 42. | Vanadium (ug/l) | | | | | .3 |
| 43. | Yttrium (mg/l) | | | | | <.006 |
| 44. | Zinc (ug/l) | | | | | 8 |
| 45. | Zirconium (ug/l) | | | | | .6 |
| 46. | Radioactivity | | | | | |
| | Gross Alpha (pcl) | | | | | 0 |
| | Radium 226* | | | | | |
| | Gross Beta (pcl) | | | | | 0 |
| | Thorium 230** | | | | | |
| | Uranium** | | | | | |
| 47. | Total Organic Carbon (TOC) | | | | | |
| | If TOC > 10 mgl/l then measure | | | | | |
| | Dissolved Organic Carbon | | | | | 112 |
| | Suspended Organic Carbon | | | | | 117 |
| | Phenols | | | | | |
| | Sulfur, Acid Extract | | | | | |
| | Nitrogen, Base Extract | | | | | |

(*) Not required

* Required if gross alpha is greater than 4 picocuries per liter (pcl).

** Required if gross beta is greater than 100 picocuries per liter (pcl).

TABLE II B 4.7 (Continued)

## WATER QUALITY ANALYSIS
## DRILLING WATER

Well Number: SG-17

| | | | | | | |
|---|---|---|---|---|---|---|
| | Sample Number | 31 | | | | |
| | Sampling Depth | 2608' | | | | |
| | Element Measured | | | | | |
| 1. | Aluminum (ug/l) | | | | | |
| 2. | Ammonia (mg/l) | | | | | |
| 3. | Arsenic (ug/l) | | | | | |
| 4 | Barium (ug/l) | | | | | |
| 5. | Beryllium (ug/l) | | | | | |
| 6. | Bicarbonate (mg/l) | 1730 | | | | |
| 7. | Bismuth (ug/l) | | | | | |
| 8. | Boron (ug/l) | <.1 | | | | |
| 9. | Cadmium (ug/l) | | | | | |
| 10. | Calcium (mg/l) | 7.4 | | | | |
| 11. | Carbonate (mg/l) | 96 | | | | |
| 12. | Cerium (mg/l) | | | | | |
| 13. | Chloride (mg/l) | <4 | | | | |
| 14. | Chrome, Hexavalent | | | | | |
| 15. | Cobalt (ug/l) | | | | | |
| 16. | Conductivity, Specific (uʊ) | | | | | |
| 17. | Copper (ug/l) | | | | | |
| 18. | Fluoride (mg/l) | 10 | | | | |
| 19. | Gallium (ug/l) | | | | | |
| 20. | Hardness, Total | | | | | |
| 21. | Hydroxide (mg/l) | | | | | |
| 22. | Iron (ug/l) | | | | | |
| 23. | Lead (ug/l) | | | | | |
| 24. | Lithium (ug/l) | | | | | |
| 25. | Magnesium (mg/l) | 3.8 | | | | |
| 26. | Manganese (ug/l) | | | | | |
| 27. | Mercury (ug/l) | | | | | |
| 28. | Molybdenum (ug/l) | | | | | |
| 29. | Nickel (ug/l) | | | | | |
| 30. | Nitrate (mg/l) | | | | | |
| 31. | pH | | | | | |
| 32. | Phosphate, Total | | | | | |
| 33. | Potassium (mg/l) | <1 | | | | |
| 34. | Selenium (ug/l) | | | | | |
| 35. | Silica (mg/l) | 15 | | | | |
| (*)36. | Silver (ug/l) | | | | | |
| 37. | Sodium (mg/l) | 740 | | | | |
| 38. | Solids, Dissolved (mg/l) | 1725 | | | | |
| 39. | Strontium (ug/l) | | | | | |
| 40. | Sulfate (mg/l) | <4 | | | | |
| 41. | Titanium (ug/l) | | | | | |
| 42. | Vanadium (ug/l) | | | | | |
| 43. | Yttrium (mg/l) | | | | | |
| 44. | Zinc (ug/l) | | | | | |
| 45. | Zirconium (ug/l) | | | | | |
| 46. | Radioactivity | | | | | |
| | Gross Alpha (pcl) | | | | | |
| | Radium 226* | | | | | |
| | Gross Beta (pcl) | | | | | |
| | Thorium 230** | | | | | |
| | Uranium** | | | | | |
| 47. | Total Organic Carbon (TOC) | | | | | |
| | If TOC > 10 mgl/l then measure | | | | | |
| | Dissolved Organic Carbon | | | | | |
| | Suspended Organic Carbon | | | | | |
| | Phenols | | | | | |
| | Sulfur, Acid Extract | | | | | |
| | Nitrogen, Base Extract | | | | | |

(*) Not required

* Required if gross alpha is greater than 4 picocuries per liter (pcl).

** Required if gross beta is greater than 100 picocuries per liter (pcl).

NEW YORK ☐
DENVER ☒
LOS ANGELES ☐

THE OIL SHALE CORPORATION

INTER OFFICE MEMORANDUM

LABORATORY DATA LETTER 75-46

FROM: F. C. Haas
TO: File

DATE: March 4, 1975
FILE NO.: 5100-3
SUBJECT: Analyses of Water Samples from C-b Tract, Core Hole SG-1

Project No. 197

Seven water samples were taken while coring Core Hole SG-1. All samples were analyzed for major constituents and four had a comprehensive analysis done. Major constituent analyses were done by Industrial Laboratories, Denver, Colorado, and TOSCO, Rocky Flats. Minor constituent analyses were done by Industrial Laboratories. Trace metals and total organic carbon were done by Commercial Testing & Engineering Co., Golden, Colorado. Radioactivity was done by Hazen Research, Inc., Golden, Colorado. Results of the analyses are attached.

There are no major discrepancies in the major constituent analyses, except in the lower aquifer 1930 feet sample. TOSCOs' calcium and sulfate values are lower than Industrial Laboratories. This is probably due to the fact that samples were analyzed at different times. Calcium sulfate and/or bicarbonate tend to precipitate with time.

Total organic carbon in all the samples was less than 10 mg/l.

Gross alpha in three of the environmental samples was above 4 pCi/l; $Ra_{226}$ was determined and found to contain less than 4 pCi/l in all three samples.

FCH/aw
Encs.

Approved (MTA)

cc: Messrs. Vawter, Schulman, Spence, Cleveland, Schillinger, Legatski (ARCO), Matis (ARCO) and Tait (ARCO)

Table 1

MAJOR CONSTITUENT ANALYSES, SG-1

| Component | 613 ft | | Base of "A" - 970 ft | | Base Mahogany Zone 1105 ft | | Top Mahogany Zone - 1366 ft | Lower Aquifer 1930 ft | | 2525 ft | Parachute |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Industrial | TOSCO | Industrial | TOSCO | Industrial | TOSCO | TOSCO | Industrial | TOSCO | Industrial | Industrial |
| Sodium, mg/l | 200 | 204 | 200 | 200 | 250 | 200 | 208 | 3390 | 2970 | 550 | 610 |
| Potassium, mg/l | NA | 0.4 | NA | 0.4 | NA | 0.3 | 0.4 | NA | 22 | <1 | <1 |
| Calcium, mg/l | 16 | 12 | 13 | 9 | 12 | 9 | 13.6 | 44 | 7 | 20 | 16 |
| Magnesium, mg/l | 22 | 21 | 17 | 15 | 15 | 15 | 20.4 | 28 | 36 | 13 | 11 |
| Sulfate, mg/l | 120 | 103 | 83 | 56 | 92 | 56 | 84 | 400 | 292 | 150 | 205 |
| Carbonate, mg/l | <0.1 | 12 | <0.1 | 5 | <0.1 | 3 | 0 | 170 | 321 | <0.1 | <0.1 |
| Bicarbonate, mg/l | 460 | 469 | 500 | 546 | 580 | 549 | 553 | 6110 | 4587 | 1280 | 1330 |
| Cloride, mg/l | 9.6 | 4 | <1 | 4 | 6.9 | 5 | 6 | 1330 | 1361 | 43 | 56 |
| Fluoride, mg/l | 9.8 | 8.2 | 10.2 | 9.6 | 10 | 9.2 | 7.8 | 10 | 14 | 14 | 14 |
| Lithium, mg/l | <0.5 | <0.5 | <0.5 | NA | <0.5 | NA | NA | 12 | 10 | NA | NA |
| Σ Cations, meq/l | 11.31 | 11.20 | 10.74 | 10.35 | 12.70 | 10.34 | 11.41 | 154 | 134 | 25.98 | 28.23 |
| Σ Anions, meq/l | 10.83 | 10.78 | 10.46 | 10.90 | 12.15 | 10.87 | 11.39 | 152 | 131 | 26.06 | 28.39 |
| % Difference | 2.2 | 1.9 | 1.3 | 2.6 | 2.2 | 2.5 | <0.1 | 0.7 | 1.1 | 0.2 | 0.3 |
| Silica, mg/l | 15 | 14 | 13 | 11 | 15 | 15 | 14 | 15 | 14 | 13 | 13 |
| pH | 8.0 | 8.5 | 7.9 | 8.3 | 7.9 | 8.3 | 8.2 | 8.5 | 9.2 | NA | NA |
| Calculated TDS, mg/l | 618 | 608 | 584 | 577 | 685 | 582 | 625 | 8393 | 7295 | 1430 | 1577 |
| Conductivity, µmhos/cm | 980 | 980 | 980 | 990 | 980 | 1020 | 1050 | 10,800 | 11,000 | NA | NA |

THE INDUSTRIAL LABORATORIES COMPANY
*Analytical and Consulting Chemists*
2600 WEST 29TH AVENUE
DENVER, COLORADO 60211
TELEPHONE 455-3641

ANALYSIS REPORT

| | |
|---|---|
| DATE RECEIVED: | 11/26/74 |
| DATE REPORTED: | 12/9/74 |
| LAB. NUMBER: | 5007 |

ATLANTIC RICHFIELD COMPANY
John Matis

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SAMPLE MARKED: SG #1 613

ANALYSIS:

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 16 | 0.798 |
| Magnesium | 22 | 1.810 |
| Sodium | 200 | 8.700 |
| Carbonate | Less than 0.1 | --- |
| Bicarbonate | 460 | 7.539 |
| Chloride | 9.6 | 0.271 |
| Sulfate | 120 | 2.498 |
| Nitrate | Less than 0.1 | --- |
| Phosphate | 0.1 | --- |
| Silicon dioxide | 15 | 0.533 |
| Iron | Less than 0.05 | --- |
| Fluoride | 9.8 | 0.515 |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 130 | |
| Total dissolved solids (calculated) | 625 | |
| Ammonia-nitrogen | 0.5 | |
| Lithium | Less than 0.5 | |
| Barium | Less than 1.0 | |
| Hexavalent chromium | Less than 0.01 | |
| Arsenic | 0.01 | |
| Selenium | Less than 0.01 | |
| Boron | Less than 0.5 | |
| Hydroside | Less than 0.1 | |

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | Less than 0.1 |
| Copper | Less than 0.1 |
| Cadmium | Less than 0.01 |
| Lead | Less than 0.05 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.05 |
| Zinc | Less than 0.5 |

pH 8.0
Specific conductance 980 micromhos per c

THE INDUSTRIAL LABORATORIES COMPANY
H. Paul Ochs
CHEMIST

MEMBERS OF:
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# THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

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ANALYSIS REPORT

TELEPHONE 455-3641

| | |
|---|---|
| DATE RECEIVED: | 11/26/74 |
| DATE REPORTED: | 12/9/74 |
| LAB. NUMBER: | 5011 |

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AMPLE MARKED: SG #1 Above Base "A" 990 feet

ANALYSIS:

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 13 | 0.649 |
| Magnesium | 17 | 1.399 |
| Sodium | 200 | 8.700 |
| Carbonate | Less than 0.1 | --- |
| Bicarbonate | 500 | 8.195 |
| Chloride | Less than 1 | --- |
| Sulfate | 83 | 1.728 |
| Nitrate | 0.9 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 13 | 0.432 |
| Iron | 0.05 | --- |
| Fluoride | 10.2 | 0.537 |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 100 | |
| Total dissolved solids (Calculated) | 585 | |
| Ammonia-nitrogen | 0.4 | |
| Lithium | Less than 0.5 | |
| Barium | Less than 1.0 | |
| Hexavalent chromium | Less than 0.01 | |
| Arsenic | Less than 0.01 | |
| Selenium | Less than 0.01 | |
| Boron | 2.8 | |
| Hydroxide | Less than 0.1 | |

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | Less than 0.1 |
| Copper | Less than 0.1 |
| Cadmium | Less than 0.01 |
| Lead | Less than 0.05 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.05 |
| Zinc | Less than 0.5 |

pH 7.9
Specific conductance 980 micromhos per cc

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ATLANTIC RICHFIELD COMPANY

| | |
|---|---|
| DATE RECEIVED: | 11/26/74 |
| DATE REPORTED: | 12/9/74 |
| LAB. NUMBER: | 5014 |

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AMPLE MARKED: SG #1 at 1105 feet Base Mine Zone

ANALYSIS:

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 12 | 0.599 |
| Magnesium | 15 | 1.249 |
| Sodium | 250 | 10.875 |
| Carbonate | Less than 0.1 | --- |
| Bicarbonate | 580 | 9.506 |
| Chloride | 6.9 | --- |
| Sulfate | 92 | 2.595 |
| Nitrate | 0.5 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 15 | 0.496 |
| Iron | 0.4 | --- |
| Fluoride | 10 | 0.526 |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 92 | |
| Total dissolved solids (calculated) | 685 | |
| Ammonia-nitrogen | 0.4 | |
| Lithium | Less than 0.5 | |
| Barium | Less than 1.0 | |
| Hexavalent chromium | Less than 0.01 | |
| Arsenic | Less than 0.01 | |
| Selenium | Less than 0.01 | |
| Boron | 2.3 | |
| Hydroxide | Less than 0.1 | |

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | Less than 0.1 |
| Copper | Less than 0.1 |
| Cadmium | Less than 0.01 |
| Lead | Less than 0.05 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.05 |
| Zinc | Less than 0.5 |

pH 7.9
Specific conductance 980 micromhos per cc

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TELEPHONE 455-3641

## ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY
2 Park Central, Suite 555
1515 Arapahoe Street
Denver, Colorado 80202
Attn: John Matis

**DATE RECEIVED:** 1/6/75
**DATE REPORTED:** 1/15/75

**LAB. NUMBER:** 5940

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**SAMPLE MARKED:** SG #1 - Lower 1930 Feet

**ANALYSIS:**

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 44 | 2.196 |
| Magnesium | 28 | 2.304 |
| Sodium (by flame) | 3,390 | 147.465 |
| Carbonate | 170 | 5.061 |
| Bicarbonate | 6,110 | 100.204 |
| Chloride | 1,330 | 37.506 |
| Sulfate | 400 | 8.320 |
| Nitrate | 0.1 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 15 | 0.499 |
| Iron | 0.12 | --- |
| Fluoride | 10 | 0.536 |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 225 | |
| Total dissolved solids (calculated) | 8,380 | |
| Ammonia-nitrogen | 36 | |
| Lithium | 12 | |
| Barium | Less than 1.0 | |
| Hexavalent chromium | Less than 0.05 | |
| Arsenic | 0.02 | |
| Selenium | Less than 0.01 | |
| Boron | 3.3 | |
| Hydroxide | Less than 0.1 | |

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | Less than 0.1 |
| Copper | Less than 0.1 |
| Cadmium | 0.02 |
| Lead | 0.10 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.05 |
| Zinc | Less than 0.5 |
| Mercury | Less than 0.01 |

pH 8.5
Specific conductance 10,800 micromhos per cc

cc: Tosco

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H. Paul Ochs
CHEMIST

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THE INDUSTRIAL LABORATORIES COMPANY
*Analytical and Consulting Chemists*
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DENVER, COLORADO 80211
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ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY

DATE RECEIVED: 1/6/75
DATE REPORTED: 1/15/75

LAB. NUMBER: 5943

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SAMPLE MARKED: Water

| ANALYSIS: | ✓ SG 1 12/6 2,525' | (BASE) ✓ SG 1 Para-chute 2179' | AT 1 12/23 9 AM | SG 17 1280-1309' 11/3 |
|---|---|---|---|---|
| Calcium | 20 | 16 | 16 | 7.4 |
| Magnesium | 13 | 11 | 9.5 | 5.3 |
| Sodium | 550 | 610 | 200 | 280 |
| Potassium | Less than 1 | Less than 1 | Less than 1 | Less than 1 |
| C[illegible]onate | Less than 0.1 | Less than 0.1 | Less than 0.1 | Less than 0.1 |
| Bicarbonate | 1,280 | 1,330 | 570 | 700 |
| Chloride | 43 | 56 | 7.0 | 9.7 |
| Fluoride | 14 | 14 | 13 | 18 |
| Sulfate | 150 | 205 | Less than 4 | Less than 4 |
| Boron | 2.0 | 1.9 | 18.1 | 1.8 |
| Silicon dioxide | 13 | 13 | 16 | 12 |

Figures are milligrams per liter

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CC: Tosco

THE INDUSTRIAL LABORATORIES COMPANY
H. Paul [illegible]
CHEMIST

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# THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211
ANALYSIS REPORT

TELEPHONE 455-3641

ATLANTIC RICHFIELD COMPANY
2 Park Central, Suite 555
1515 Arapahoe Street
Denver, Colorado 80202

Attn: JOhn Matis

DATE RECEIVED: 1/6/75
DATE REPORTED: 1/17/75

LAB. NUMBER: 5943

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SAMPLE MARKED: Water

ANALYSIS:

| | ✓ SG 1 12/6 2,525' | ✓ SG 1 Para-chute | AT 1 12/23 9 AM | SG 17 1280-1309' 11/3 |
|---|---|---|---|---|
| Calcium | 0.988 | 0.798 | 0.798 | 0.369 |
| Magnesium | 1.070 | 0.905 | 0.782 | 0.436 |
| Sodium | 23.925 | 26.535 | 8.700 | 12.180 |
| Bicarbonate | 20.992 | 21.812 | 9.348 | 11.480 |
| Chloride | 1.213 | 1.580 | --- | 0.274 |
| Sulfate | 3.120 | 4.264 | --- | --- |
| Silicon dioxide | 0.433 | 0.433 | 0.533 | 0.400 |

| | SG 17 DST 18 1,374' | SG 17 12/12 DST 28 1,514-1,572' | SG 17 DST 21 12/20 1,473-1,522' | SG 17 12/14 DST 24 1,561-1.622' |
|---|---|---|---|---|
| CAlcium | 0.284 | 0.205 | 0.205 | 0.245 |
| Magnesium | 0.370 | 0.403 | 0.304 | 0.658 |
| Sodium | 11.310 | 13.050 | 10.875 | 14.138 |
| Bicarbonate | 10.988 | 12.136 | 10.332 | 13.612 |
| Chloride | --- | 0.367 | --- | 0.395 |
| Fluoride | 0.999 | 1.052 | 1.052 | 1.052 |
| Sulfate | --- | --- | --- | --- |
| Silicon dioxide | 0.533 | 0.556 | 0.533 | 0.566 |

Figures are milli-equivalents

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**COMMERCIAL TESTING & ENGINEERING CO.**
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, Colorado 80401

Date: 9 January 75

Analyst: S. Sweeney

P. O. No.:

Sample No.: SG #1 @ 613'

IAD No.: 97-183-002-12

CONCENTRATION IN µg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | 0.004 |
| Thorium | | Gadolinium | | Molybdenum | 0.02 | Titanium | 0.1 |
| Bismuth | | Europium | | Niobium | | Scandium | 0.002 |
| Lead | ≤0.01 | Samarium | | Zirconium | | Calcium | * |
| Thallium | | Neodymium | | Yttrium | | Potassium | * |
| Mercury | NR | Praseodymium | | Strontium | 8 | Chlorine | * |
| Gold | | Cerium | | Rubidium | 0.005 | Sulfur | * |
| Platinum | | Lanthanum | | Bromine | 0.03 | Phosphorus | 0.09 |
| Iridium | | Barium | 0.2 | Selenium | | Silicon | * |
| Osmium | | Cesium | | Arsenic | 0.02 | Aluminum | 0.1 |
| Rhenium | | Iodine | | Germanium | | Magnesium | * |
| Tungsten | | Tellurium | | Gallium | 0.002 | Sodium | * |
| Tantalum | | Antimony | | Zinc | 0.01 | Fluorine | * |
| Hafnium | | Tin | | Copper | 0.08 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 0.04 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | 0.001 | Carbon | NR |
| Thulium | | Silver | | Iron | 0.08 | Boron | 0.4 |
| Erbium | | Palladium | | Manganese | 0.01 | Beryllium | |
| Holmium | | Rhodium | | Chromium | 0.01 | Lithium | 0.4 |
| Dysprosium | | | | | | Hydrogen | NR |

NR — Not Reported
All elements not reported <0.002 µg/ml
* Not reported upon request

Approved: M Jacobs

**COMMERCIAL TESTING & ENGINEERING CO.**
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Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, CO 80401

Date: 9 January 75

Analyst: S. Sweeney

P. O. No.:

Sample No.: ARCO SG #1 Abone Base "A" at 9~~7~~90'

IAD No.: 97-183-002-12

CONCENTRATION IN µg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | 0.001 |
| Thorium | | Gadolinium | | Molybdenum | 0.01 | Titanium | 0.03 |
| Bismuth | | Europium | | Niobium | | Scandium | <0.001 |
| Lead | 0.01 | Samarium | | Zirconium | | Calcium | * |
| Thallium | | Neodymium | | Yttrium | | Potassium | * |
| Mercury | NR | Praseodymium | | Strontium | 2 | Chlorine | * |
| Gold | | Cerium | | Rubidium | 0.01 | Sulfur | * |
| Platinum | | Lanthanum | | Bromine | 0.02 | Phosphorus | 1 |
| Iridium | | Barium | 0.1 | Selenium | | Silicon | * |
| Osmium | | Cesium | 0.007 | Arsenic | 0.02 | Aluminum | 0.4 |
| Rhenium | | Iodine | | Germanium | | Magnesium | * |
| Tungsten | | Tellurium | | Gallium | | Sodium | * |
| Tantalum | | Antimony | | Zinc | 0.05 | Fluorine | * |
| Hafnium | | Tin | | Copper | 0.1 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 0.02 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | 0.006 | Carbon | NR |
| Thulium | | Silver | | Iron | 0.1 | Boron | 0.1 |
| Erbium | | Palladium | | Manganese | 0.03 | Beryllium | 0.001 |
| Holmium | | Rhodium | | Chromium | 0.009 | Lithium | 4 |
| Dysprosium | | | | | | Hydrogen | NR |

NR — Not Reported
All elements not reported <0.003 µg/ml
*Not reported upon request

Approved:

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Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, Colorado 80401

Date: 9 January 75

Analyst: S. Sweeney

P. O. No.:

Sample No.: ARCO et al SG #1 @ 1105'
Base mine zone

IAD No.: 97-183-002-12

CONCENTRATION IN µg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | 0.002 |
| Thorium | | Gadolinium | | Molybdenum | 0.03 | Titanium | 0.2 |
| Bismuth | | Europium | | Niobium | | Scandium | 0.001 |
| Lead | 0.03 | Samarium | | Zirconium | | Calcium | * |
| Thallium | | Neodymium | | Yttrium | | Potassium | * |
| Mercury | NR | Praseodymium | | Strontium | 2 | Chlorine | * |
| Gold | | Cerium | | Rubidium | 0.008 | Sulfur | * |
| Platinum | | Lanthanum | | Bromine | 0.02 | Phosphorus | 0.2 |
| Iridium | | Barium | 0.1 | Selenium | **0.08 | Silicon | * |
| Osmium | | Cesium | 0.004 | Arsenic | **0.08 | Aluminum | MC |
| Rhenium | | Iodine | 0.003 | Germanium | | Magnesium | * |
| Tungsten | | Tellurium | | Gallium | 0.003 | Sodium | * |
| Tantalum | | Antimony | | Zinc | 0.04 | Fluorine | * |
| Hafnium | | Tin | | Copper | 0.06 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 0.02 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | 0.01 | Carbon | NR |
| Thulium | | Silver | | Iron | 0.1 | Boron | 0.2 |
| Erbium | | Palladium | | Manganese | 0.04 | Beryllium | 0.001 |
| Holmium | | Rhodium | | Chromium | 0.02 | Lithium | 1 |
| Dysprosium | | | | | | Hydrogen | NR |

NR — Not Reported
All elements not reported <0.003 µg/ml
MC - Major Component - element greater than 10 µg/ml

Approved:

*Not reported upon request
**Heterogeneous

**COMMERCIAL TESTING & ENGINEERING CO.**
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Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. Frank Haas.
The Oil Shale Corp.
18200 West Hiway 72
Golden, CO 80401

Date: 4 February 75

Analyst: S. Sweeney

P. O. No.:

Sample No.: ARCO environmental sample SG-1 Lower Aquifer SG-1 Pkr set @ 1930'

IAD No.: 97-210-002-06

CONCENTRATION IN µg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | 0.06 |
| Thorium | | Gadolinium | | Molybdenum | 0.06 | Titanium | 0.2 |
| Bismuth | | Europium | | Niobium | 0.01 | Scandium | 0.001 |
| Lead | 0.01 | Samarium | | Zirconium | 0.1 | Calcium | * |
| Thallium | | Neodymium | | Yttrium | 0.002 | Potassium | * |
| Mercury | NR | Praseodymium | 0.004 | Strontium | 5 | Chlorine | * |
| Gold | | Cerium | | Rubidium | 0.03 | Sulfur | * |
| Platinum | | Lanthanum | 0.008 | Bromine | 2 | Phosphorus | 0.2 |
| Iridium | | Barium | 0.5 | Selenium | | Silicon | * |
| Osmium | | Cesium | 0.2 | Arsenic | 0.2 | Aluminum | 0.2 |
| Rhenium | | Iodine | 2 | Germanium | 0.01 | Magnesium | * |
| Tungsten | | Tellurium | | Gallium | 0.01 | Sodium | * |
| Tantalum | | Antimony | 0.01 | Zinc | 0.03 | Fluorine | * |
| Hafnium | | Tin | | Copper | 0.05 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 0.1 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | 0.009 | Carbon | NR |
| Thulium | | Silver | | Iron | 0.3 | Boron | >10 |
| Erbium | | Palladium | | Manganese | 0.07 | Beryllium | 0.001 |
| Holmium | | Rhodium | | Chromium | 0.004 | Lithium | >10 |
| Dysprosium | | | | | | Hydrogen | NR |

NR — Not Reported
All elements not reported <0.003 µg/ml
*Not reported upon request

Approved: M L Jacobs

**COMMERCIAL TESTING & ENGINEERING CO.**
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434

SINCE 1908

Reply to
Instrumental Analysis Division
14335 West 44th Avenue
Golden, Colorado 80401

Phone: 303-278-9521

9 January 75

Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, CO 80401

RE: IAD #97-183-002-12

## Analytical Report

| | TOC*<br>mg/liter |
|---|---|
| Environmental Cb-4 (11-17-74) | -1 |
| Environmental Cb-2 (11-16-74) | -1 |
| Environmental Cb-1 (11-18-74) | 1 |
| ✓ ARCO SG #1 above Base "A" grove @ 970' | -1 |
| ✓ ARCO et al SG #1 @ 1105' Base mine Zone | -1 |
| ARCO et al SG #17 #7 Dst. 1017'-1062' | -1 |
| ARCO et al SG #8 Btm of mining zone @ 1013' | -1 |
| Top of parachute cr @ 706 | -1 |
| ARCO et al SG #8 971-Top of mining zone (11-4-74) | -1 |
| ✓ SG #1 @ 613' | -1 |
| ARCO SG #8 600' 1600 mΩ 10-26-74 | -1 |
| ARCO et al #17 Dst Depth 808' (11-9-74) | 6 |

*Test performed on water make "Regular".
Minus sign indicates less than reported value.

M L Jacobs

M. L. Jacobs, Ph.D.
Divisional Manager

MLJ/hb

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CABLE ADDRESS COMTEC

**COMMERCIAL TESTING & ENGINEERING CO.**
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434

SINCE 1908

Reply to
Instrumental Analysis Division
14335 West 44th Avenue
Golden, Colorado 80401

Phone: 303-278-9521

3 February 75

Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, CO 80401

Re: IAD #97-210-002-06

| Analytical Report | TOC*<br>mg/liter |
|---|---|
| ✓ 1) ARCO environmental sample SG-1 Lower Aquifer<br>SG-1 Pkr set @ 1930' | 3 |
| 2) ARCO environmental upper aquifer - conductivity<br>2500 mμ - Pkr set @ 950' - 12/17/74<br>Temp. 25.5°C Jetting #2 SG-8 | <1 |
| 3) ARCO environmental sample lower aquifer SG-8<br>Pkr set @ 1910' conductivity 8000 mμ<br>Temp. 29.5°C | 3 |

*Test performed on water marked "Regular"
Outside Laboratory

M L Jacobs
M. L. Jacobs, Ph.D.
Divisional Manager

MLJ/hb

AMERICAN COUNCIL OF INDEPENDENT LABORATORIES

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HAZEN RESEARCH, INC.
4601 Indiana Street
Golden, Colorado 80401

Mr. Frank C. Haas
The Oil Shale Corporation
18200 West Highway 72
Golden, Colorado 80401

Date: January 2, 1975
HRI Project No. 535
HRI Series No. 7655
Samples received: Nov. 27, 1974

# REPORT OF ANALYSIS

| Analysis No. | Sample Designation | α Total | pCi/l ± | α Precision* | β Total | pCi/l ± | β Precision* | $Ra^{226}$ | pCi/l ± | Precision* |
|---|---|---|---|---|---|---|---|---|---|---|
| 7655-1✓ | Arco et al SG#10-1105 Base Mine Zone | 9.7 | ± | 2.6 | 0 | ± | 8 | 0.3 | ± | 0.4 |
| -2 | Environmental Cb-1 11/18 | 4.3 | ± | 5.5 | 0 | ± | 25 | 0.1 | ± | 0.4 |
| -3 | Arco et al SG#8 Bottom of Mining zone @ 1013 | 3.4 | ± | 2.6 | 0 | ± | 11 | | | |
| -4✓ | Arco SG#1 Above Base "A" Grove @ 970 | 0 | ± | 1.6 | 0 | ± | 7 | | | |
| -5 | Environmental Cb-2 11/16 | 1.8 | ± | 2.3 | 0 | ± | 9 | | | |
| -6 | Top of Parachute @ 706 | 0.4 | ± | 1.6 | 0 | ± | 8 | | | |
| -7 | Arco et al SG#17, #7 DST 1015-1062 | 4.5 | ± | 2.0 | 0 | ± | 8 | 0.3 | ± | 0.5 |
| -8✓ | SG#1-613 | 11 | ± | 3 | 0 | ± | 8 | 0 | ± | 0.4 |
| -9 | Arco et al SG#17 DST Depth 808 11/9 | 1.3 | ± | 1.5 | 0 | ± | 8 | | | |
| -10 | Environmental Cb-4 11/17 | 1.0 | ± | 1.5 | 0 | ± | 8 | | | |
| -11 | Arco et al SG#8 Depth 971 Top of Mining Zone 11/4 | 0.8 | ± | 2.5 | 0 | ± | 11 | | | |
| -12 | Arco SG#8 600 ft. 1600 ml 10/26 | 2.6 | ± | 2.0 | 0 | ± | 8 | | | |

*Variability of the radioactive disintegration process (counting error) at the 95% confidence level, $1.96\sigma$

By:
John C. Jarvis
Manager, Analytical Laboratory

ljb

HAZ RESEARCH, INC.
4601 Indiana Street
Golden, Colorado 80401

Mr. Frank Haas
The Oil Shale Corporation
18200 West Highway 72
Golden, Colorado 80401

Date: February 19, 1975
HRI Project No. 535
HRI Series No. 7791
Samples received Jan. 6, 1975
P.O. Number

## REPORT OF ANALYSIS

| Analysis No. | Sample Designation | pCi/l<br>α Total | α ± Precision** | pCi/l<br>β Total | β ± Precision** |
|---|---|---|---|---|---|
| 7791-1* | 212-83 | 17 | ± 3 | 0 | ± 10 |
| -2* | ARCO Environmental Sample<br>Lower Aquifer SG-8 | 24 | ± 15 | 0 | ± 69 |
| -3* ✓ | ARCO Environmental Sample<br>Lower Aquifer SG-1 | 28 | ± 17 | 0 | ± 74 |
| -4 | ARCO Environmental Sample<br>Upper Aquifer Setting 2, SG-8 | 2.1 | ± 3.7 | 0 | ± 16 |

By: John C. Jarvis
John C. Jarvis
Manager, Analytical Laboratory

ljb

*$Ra^{226}$ Analysis in progress; results to follow at a later date.

**Variability of the radioactive disintegration process (counting error) at the 95% confidence level, 1.96σ

HAZEN RESEARCH, INC.

4601 INDIANA STREET
GOLDEN, COLORADO • 80401
TELEPHONE 303/279-4501

# REPORT OF ANALYSIS

Supplement to report dated February 19, 1975

Mr. Frank C. Haas
The Oil Shale Corporation
18200 West Highway 72
Golden, Colorado 80401

Date: February 27, 1975

HRI Project No. 535
HRI Series No. 7791
Samples Rec'd 1/6/75

| Analysis No. | Sample Designation | pCi/l | | |
|---|---|---|---|---|
| | | $Ra^{226}$ | ± | Precision* |
| 7791-1 | 212-83 | 8.4 | ± | 3.8 |
| -2 | ARCO Environmental Sample Lower Aquifer SG-8 | 2.7 | ± | 2.2 |
| -3 ✓ | ARCO Environmental Sample ~~Upper~~ Aquifer SG-1~~5~~ Lower | 3.0 | ± | 1.9 |

By:
John C. Jarvis
Manager, Analytical Laboratory

*Variability of the radioactive disintegration process (counting error) at the 95% confidence level, 1.96$\sigma$

amb

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*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211
ANALYSIS REPORT

TELEPHONE 455-3641

| | |
|---|---|
| DATE RECEIVED: | 11/26/74 |
| DATE REPORTED: | 12/6/74 |
| LAB. NUMBER: | 5012 |

ATLANTIC RICHFEILD COMPANY
John Matis

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

Which well? (SG-1)

SAMPLE MARKED: *Top of Parachute at 706 feet

**ANALYSIS:**

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 14 | 0.699 |
| Magnesium | 20 | 1.646 |
| Sodium | 210 | 9.135 |
| Carbonate | Less than 0.1 | --- |
| Bicarbonate | 520 | 8.523 |
| Chloride | 5.5 | --- |
| Sulfate | 100 | 2.082 |
| Nitrate | 0.2 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 14 | 0.466 |
| Iron | Less than 0.05 | --- |
| Fluoride | 9.9 | 0.521 |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 120 | |
| Total dissolved solids (calculated) | 625 | |
| Ammonia-nitrogen | 0.5 | |
| Lithium | Less than 0.5 | |
| Barium | Less than 1 | |
| Hexavalent chromium | Less than 0.01 | |
| Arsenic | Less than 0.01 | |
| Selenium | Less than 0.01 | |
| Boron | 2.7 | |
| Hydroxide | Less than 0.1 | |

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | Less than 0.1 |
| Copper | Less than 0.1 |
| Cadmium | Less than 0.01 |
| Lead | Less than 0.05 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.05 |
| Zinc | Less than 0.5 |

pH 8.0
Specific conductance 940 micromhos per cc

THE INDUSTRIAL LABORATORIES COMPANY
H. Paul Ochs
CHEMIST

* difficulty in picking top of P.Crk.

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SIGMA XI

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DENVER ☐
GOLDEN ☒
NEW YORK ☐

# THE OIL SHALE CORPORATION

INTER OFFICE MEMORANDUM

LABORATORY DATA LETTER 75-48

| | | | |
|---|---|---|---|
| FROM: | F. C. Haas | DATE: | March 4, 1975 |
| | | FILE NO.: | |
| TO: | File | SUBJECT: | Analyses of Water Samples from C-b Tract, Core Hole SG-20 |

Five water samples were taken while coring SG-20. Samples were analyzed for major constituents only. Analyses were done by Industrial Laboratories, Denver, Colorado and TOSCO, Rocky Flats. Results are attached.

FCH

FCH/br

MTA

Approved (MTA)

cc: R. G. Vawter
B. L. Schulman
H. M. Spence
T. H. Cleveland
A. W. Schillinger
M. W. Legatski
D. B. Tait
J. R. Matis

## TABLE 1

## MAJOR CONSTITUENT ANALYSES, SG-20

| Component | Top of P.C. 515 ft Industrial | 850 ft Industrial | DST No. 1 945 ft TOSCO | *DST No. 2 981.5 ft TOSCO | Jetting TD (987') Industrial |
|---|---|---|---|---|---|
| Sodium, mg/l | 190 | 530 | 780 | 670 | 680 |
| Potassium, mg/l | <1 | <1 | 0.9 | 1.2 | <1 |
| Calcium, mg/l | 7.4 | 6.6 | 4.9 | 4.9 | 7.4 |
| Magnesium, mg/l | 3.5 | 5.2 | 3.0 | 3.1 | 6.2 |
| Sulfate, mg/l | 56 | 14 | <4 | <4 | <4 |
| Carbonate, mg/l | <0.1 | <0.1 | 24 | 38 | <0.1 |
| Bicarbonate, mg/l | 500 | 1,380 | 1,911 | 1,569 | 1,760 |
| Chloride, mg/l | 4.2 | 9.8 | 13 | 21 | 9.8 |
| Fluoride, mg/l | 3.6 | 19 | 23 | 20 | 24 |
| $\Sigma$ Cations, meg/l | 8.92 | 23.80 | 34.42 | 29.65 | 30.45 |
| $\Sigma$ Anions, meg/l | 9.67 | 24.19 | 33.67 | 28.66 | 30.39 |
| % Difference | 4.0 | 0.8 | 1.1 | 1.7 | <0.1 |
| Silica, mg/l | 15 | 15 | 11 | 12 | 11 |
| pH | NA | NA | 8.4 | 8.6 | NA |
| Calculated TDS, mg/l | 525 | 1,276 | 1,796 | 1,540 | 1,600 |
| Conductivity, micromhos/cm | NA | NA | 2,200 | 2,100 | NA |

NA - Not Analyzed

* Data cannot be placed stratigraphically

THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211
TELEPHONE 455-3641

ANALYSIS REPORT

DATE RECEIVED: 1/6/75
DATE REPORTED: 1/15/75

ATLANTIC RICHFIELD COMPANY

LAB. NUMBER: 5944
Page 2

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

SAMPLE MARKED: Water

ANALYSIS:

| | SG 17<br>12/20 | SG 20<br>Jetting TD | SG 20<br>Top of<br>Parachute<br>515' | SG 20<br>12/6<br>850' |
|---|---|---|---|---|
| Calcium | 4.9 | 7.4 | 7.4 | 6.6 |
| Magnesium | 3.4 | 6.2 | 3.5 | 5.2 |
| Sodium | 250 | 680 | 190 | 530 |
| Potassium | Less than 1 | Less than 1 | Less than 1 | Less than 1 |
| Carbonate | Less than 0.1 | Less than 0.1 | Less than 0.1 | Less than 0.1 |
| Bicarbonate | 620 | 1,760 | 500 | 1,380 |
| Chloride | 5.6 | 9.8 | 4.2 | 9.8 |
| Fluoride | 8.9 | 24 | 3.6 | 19 |
| Sulfate | Less than 4 | Less than 4 | 56 | 14 |
| Boron | 0.9 | 1.4 | 0.1 | 2.5 |
| Silicon dioxide | 15 | 11 | 15 | 15 |

Figures are milligrams per liter

cc: Tosco

THE INDUSTRIAL LABORATORIES COMPANY

CHEMIST

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SIGMA XI

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## ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY

DATE RECEIVED: 1/6/75
DATE REPORTED: 1/17/75

LAB. NUMBER: 5944

SUPPLEMENTAL REPORT

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

SAMPLE MARKED: Water

ANALYSIS:

| | SG 18<br>12/13<br>1,622' | SG 17<br>DST 26<br>12/12<br>1,658-1,720' | SG 17<br>DST 27<br>12/18<br>1,711-1,770' | SG 17<br>DST 28<br>1,768' |
|---|---|---|---|---|
| Calcium | 0.329 | 0.245 | 0.409 | 0.369 |
| Magnesium | 0.230 | 0.560 | 0.272 | 0.272 |
| Sodium | 12.180 | 25.665 | 40.890 | 41.730 |
| Carbonate | --- | --- | 2.697 | --- |
| Bicarbonate | 11.539 | 24.519 | 35.566 | 40.369 |
| Chloride | --- | 0.564 | 0.959 | 0.818 |
| Fluoride | 1.052 | 1.202 | 1.315 | 1.202 |
| licon dioxide | 0.500 | 0.566 | 0.500 | 0.466 |

| | SG 17<br>12/20 | SG 20<br>Jetting TD | SG 20<br>Top of<br>Parachute<br>515' | SG 20<br>12/6<br>850' |
|---|---|---|---|---|
| Calcium | 0.245 | 0.369 | 0.369 | 0.329 |
| Magnesium | 0.280 | 0.510 | 0.283 | 0.428 |
| Sodium | 10.875 | 29.580 | 8.265 | 23.055 |
| Bicarbonate | 10.036 | 28.846 | 8.177 | 22.585 |
| Chloride | --- | 0.276 | --- | 0.276 |
| Fluoride | 0.999 | 1.262 | --- | 0.999 |
| Sulfate | --- | --- | 1.166 | 0.291 |
| Silicon dioxide | 0.500 | 0.366 | 0.500 | 0.500 |

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THE INDUSTRIAL LABORATORIES COMPANY

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THE OIL SHALE CORPORATION

INTER OFFICE MEMORANDUM

LOS ANGELES ☐
DENVER ☐
GOLDEN ☒
NEW YORK ☐

LABORATORY DATA LETTER 75-50

FROM: F. C. Haas
DATE: March 4, 1975
FILE NO.:
TO: File
SUBJECT: Analyses of Water Samples from C-b Tract, Core Hole SG-21

Five water samples were taken while coring SG-21. Samples were analyzed for major constituents only. Analyses were done by Industrial Laboratories, Denver, Colorado and TOSCO, Rocky Flats. Results are attached. The ionic balance on the sample from 980 feet is not too good.

FCH
FCH/br

WATT
Approved (MTA)

cc: R. G. Vawter
B. L. Schulman
H. M. Spence
T. H. Cleveland
A. W. Schillinger
M. W. Legatski
D. B. Tait
J. R. Matis

## TABLE 1

## MAJOR CONSTITUENT ANALYSES, SG-21

| Component | Top of P.C. 676 ft TOSCO | DST No. 2 950-1009 ft Industrial | 980 ft Industrial | DST No. 1 1000-1035 ft Industrial | J.T. 1035 ft Industrial |
|---|---|---|---|---|---|
| Sodium, mg/l | 160 | 135 | 165 | 400 | 240 |
| Potassium, mg/l | 0.4 | <1 | <1 | <1 | NA |
| Calcium, mg/l | 31 | 34 | 7.4 | 8.2 | 7.4 |
| Magnesium, mg/l | 26 | 33 | 3.8 | 7.2 | 3.3 |
| Sulfate, mg/l | 124 | 125 | <1 | 455 | 18 |
| Carbonate, mg/l | 6 | <0.1 | 12 | <0.1 | 50 |
| Bicarbonate, mg/l | 422 | 470 | 530 | 500 | 360 |
| Chloride, mg/l | 3.2 | 7 | 5.6 | 1.4 | 82 |
| Fluoride, mg/l | 1.4 | 4.9 | 16 | 16 | 16 |
| Σ Cations, meg/l | 10.70 | 10.29 | 7.86 | 18.39 | 11.08 |
| Σ Anions, meg/l | 9.85 | 10.76 | 10.08 | 18.56 | 11.09 |
| % Difference | 4.1 | 2.2 | 12.4 | 0.5 | <0.1 |
| Silica, mg/l | 23 | 19 | 18 | 13 | 12 |
| pH | 8.4 | NA | NA | NA | 8.5 |
| Calculated TDS, mg/l | 581 | 588 | 488 | 1,146 | 605 |
| Conductivity, micromhos/cm | 750 | NA | NA | NA | NA |

NA - Not Analyzed

# THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211
TELEPHONE 455-3641

ANALYSIS REPORT

DATE RECEIVED: 1/6/75
DATE REPORTED: 1/15/75

ATLANTIC RICHFIELD COMPANY

LAB. NUMBER: 5945

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

SAMPLE MARKED: Water

ANALYSIS:

| | DST 2 ✓<br>SG 21<br>950-1009' | SG 21 ✓<br>12/18<br>980' | SG 21 ✓<br>DST #1<br>12/19<br>1000-1035' | SG 17<br>DST 28<br>12/15<br>1618-1670' |
|---|---|---|---|---|
| Calcium | 34 | 7.4 | 8.2 | 5.7 |
| Magnesium | 33 | 3.8 | 7.2 | 4.3 |
| Sodium | 135 | 165 | 400 | 480 |
| Potassium | Less than 1 | Less than 1 | Less than 1 | Less than 1 |
| Carbonate | Less than 0.1 | 12 | Less than 0.1 | 46 |
| Bicarbonate | 470 | 530 | 500 | 1,110 |
| Chloride | 7.0 | 5.6 | 1.4 | 18 |
| Fluoride | 4.9 | 16 | 16 | 25 |
| Sulfate | 125 | Less than 1 | 455 | 4.0 |
| Boron | 0.3 | Less than 0.1 | 0.6 | 1.4 |
| Silicon dioxide | 19 | 18 | 13 | 21 |

Figures are milligrams per liter

cc: Tosco

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AMERICAN OIL CHEMISTS' SOCIETY
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THE INDUSTRIAL LABORATORIES COMPANY

H. Paul [illegible]

CHEMIST

# THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211
TELEPHONE 455-3641

## ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY
John Matis

**DATE RECEIVED:** 1/23/75
**DATE REPORTED:** 1/30/75

**LAB. NUMBER:** 6453

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

**SAMPLE MARKED:** SG #21 Jetting Test 1,035 feet

**ANALYSIS:**

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 7.4 | 0.369 |
| Magnesium | 3.3 | 0.272 |
| Sodium | 240 | 10.400 |
| Carbonate | 50 | 1.665 |
| Bicarbonate | 360 | 5.900 |
| Chloride | 82 | 2.313 |
| Sulfate | 18 | 0.375 |
| Nitrate | Less than 0.1 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 12 | 0.400 |
| Iron | Less than 0.05 | --- |
| Fluoride | 16 | 0.841 |
| P. alkalinity, in terms of calcium carbonate | 41 | |
| MO alkalinity, in terms of calcium carbonate | 300 | |
| Hardness, in terms of calcium carbonate | 32 | |
| Total dissolved solids (calculated) | 610 | |
| Boron | 0.6 | |

pH 8.5

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# THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211

TELEPHONE 455-3641

**ANALYSIS REPORT**

ATLANTIC RICHFIELD COMPANY
2 Park Central, Suite 555
1515 Arapahoe Street
Denver, Colorado 80202
Attn: John Matis

**DATE RECEIVED:** 1/6/75
**DATE REPORTED:** 3/17/75

**LAB. NUMBER:** 5945

CORRECTED COPY

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ECT.) IN ADVANCE.

**SAMPLE MARKED:** Water - SG 21 12/18 980 Feet

**ANALYSIS:**

| | |
|---|---|
| Sodium | 230 milligrams per liter |
| Sodium | 10.00 milli-equivalents |
| Magnesium | 0.313 " " |

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LABORATORY DATA LETTER 75-39

FROM: F. C. Haas
TO: File

DATE: March 3, 1975
FILE NO.: 5100-3
SUBJECT: Analyses of Water Samples from C-b Tract, Core Hole SG-17

Project 197

Thirty-one water samples were taken in the course of drilling Core Hole SG-17. Four samples were marked "Environmental" and comprehensive analysis was done on these. Major constituent analyses were done on the balance of samples. Major constituent analyses were done by Industrial Laboratories, Denver, Colorado, and TOSCO, Rocky Flats. TOSCO analyzed sixteen of the thirty-one samples with results listed in Table 1. Minor constituents were done by Industrial Laboratories. Trace metals and total organic carbon was done by Commercial Testing & Engineering, Golden, Colorado. Radioactivity was done by Hazen Research, Inc., Golden, Colorado. Results of the analyses are attached.

There are no major discrepancies in the analyses except for the sample from DST #34, 2120-2170'. The sample is highly saline and this may account for some of the differences. The big discrepancy is in the boron analysis. Industrial Laboratories reports 156 mg/l (as $BO_2$); CT&E reports 2,800 mg/l (as $BO_2$); and TOSCO obtained 1,188 and 1,070 mg/l (as $BO_2$) by two different methods, colorimetric and atomic absorption. CT&E used flame emission; high sodium can interfere using this technique. Industrial Laboratories used a colorimetric procedure different from TOSCO's.

In addition to $Na_2CO_3$, $NaHCO_3$ and NaCl, the sample from DST #34 is high in nitrate (1,260 mg/l), ammonia-nitrogen (137 mg/l), borate (1,100 mg/l), barium (5 mg/l) lithium (60 mg/l), fluoride (50 mg/l), bromine (1 mg/l) and iodine (0.8 mg/l). The sample is high in total organic carbon (117 mg/l) and dissolved organic carbon (112 mg/l). An extraction for organic groups is being made and will be reported at a later date. The sample was low in radioactivity.

In all of the other samples, total organic carbon was less than 10 mg/l. Three of the samples had gross alpha greater than 4p Ci/l; Ra226 was determined, but was found to be less than 4p Ci/l.

FCH/as
Encs.

Approved (MTA)

cc: R. G. Vawter
B. L. Schulman
H. M. Spence
T. H. Cleveland
A. W. Schillinger
M. W. Legatski
D. B. Tait
J. R. Matis

## TABLE 1

## MAJOR CONSTITUENT ANALYSES, CORE HOLE SG -17

| Component | DST, 808' | | Top of P.C. 859' | | DST #3 822-869' | | DST #4 866-919' | DST #5 919-970' | DST #6 970-1017' | | DST #7 1015-1062' | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ind. | TOSCO | Ind. | TOSCO | Ind. | TOSCO | TOSCO | TOSCO | Ind. | TOSCO | Ind. | TOSCO |
| Na, mg/l | 180 | 177 | 180 | 190 | 200 | 205 | 214 | 211 | 250 | 232 | 220 | 232 |
| K, mg/l | N.A. | 0.4 | N.A. | 0.4 | N.A. | 0.4 | 0.4 | 1.1 | N.A. | 0.9 | N.A. | 0.4 |
| Ca, mg/l | 4.9 | 5.8 | 4.5 | 4.2 | 5.3 | 4.4 | 3.2 | 10 | 3.3 | 2.0 | 3.7 | 2.0 |
| Mg, mg/l | 0.7 | 1.4 | 2.1 | 2.0 | 1.9 | 2.0 | 2.7 | 6 | 2.6 | 2.2 | 2.1 | 2.1 |
| $SO_4$, mg/l | <4 | <4 | <4 | 4 | <4 | 4 | <4 | 4.6 | <4 | <4 | <4 | 10 |
| $CO_3$, mg/l | <1 | 12 | <0.1 | 12 | <0.1 | 16 | 10 | 0 | <0.1 | 4.8 | <0.1 | 6 |
| $HCO_3$, mg/l | 430 | 403 | 440 | 428 | 490 | 462 | 495 | 533 | 620 | 594 | 580 | 561 |
| Cl, mg/l | <1 | 3 | 6.9 | 3 | 6.9 | 1.4 | 2.3 | 4.1 | 4.1 | 1.6 | 4.1 | 1.9 |
| F, mg/l | 10 | 12.8 | 10 | 12.8 | 11 | 14.5 | 15.3 | 13.5 | 12 | 18 | 12 | 17 |
| ΣCations, meq/l | 8.13 | 8.11 | 8.22 | 8.64 | 9.12 | 9.31 | 9.64 | 10.20 | 11.25 | 10.39 | 9.92 | 10.37 |
| ΣAnions, meq/l | 7.58 | 7.77 | 7.93 | 8.27 | 8.81 | 9.04 | 9.31 | 10.52 | 10.91 | 10.89 | 10.26 | 10.56 |
| % Difference | 3.5 | 2.1 | 1.8 | 2.2 | 1.7 | 1.5 | 1.7 | 1.5 | 1.5 | 2.4 | 1.7 | 0.9 |
| $SiO_2$, mg/l | 16 | 15 | 17 | 14 | 14 | 13 | 13 | 11 | 14 | 11 | 13 | 13 |
| pH | 7.9 | 8.9 | 8.2 | 9.0 | 7.9 | 9.1 | 8.6 | 8.2 | 8.1 | 8.3 | 8.1 | 8.4 |
| Calculated TDS, mg/l | 422 | 425 | 434 | 453 | 479 | 487 | 503 | 564 | 590 | 564 | 540 | 559 |
| Conductivity, micromhos/cm | 680 | 690 | 730 | 760 | 800 | 825 | 700 | 770 | 950 | 980 | 910 | 920 |

TABLE 1 (Cont'd)

| | DST #8 1066-1116.7' | | DST #9 1115-1166' | 1180' | | DST #11 1200-1224' | | DST #13 1224-1250' | | Depth 1250' | | DST #17 1327-1374' | | DST #19 1423-1470' |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Component | Ind. | TOSCO | TOSCO | Ind. | TOSCO | Ind. | TOSCO | Ind. | TOSCO | Ind. | TOSCO | Ind. | TOSCO | TOSCO |
| Na, mg/l | 315 | 267 | 303 | 245 | 270 | 420 | 445 | 370 | 389 | 340 | 346 | 300 | 298 | 240 |
| K, mg/l | N.A. | 0.4 | 0.5 | <1 | 0.2 | <1 | 0.7 | <1 | 0.5 | <1 | 0.4 | <1 | 0.4 | 1 |
| Ca, mg/l | 4.9 | 2.0 | 2.2 | 8.2 | 2.5 | 9.0 | 3.6 | 22 | 10 | 9.0 | 3 | 8.2 | 4 | 4 |
| Mg, mg/l | 5.3 | 2.1 | 2.1 | 8.2 | 1.2 | 4.3 | 1.8 | 3.6 | 2.1 | 2.8 | 2 | 3.3 | 2 | 3 |
| $SO_4$, mg/l | <4 | <4 | 5 | <4 | 19 | <4 | 19 | 105 | 103 | <4 | 14 | <4 | 16 | <4 |
| $CO_3$, mg/l | 72 | 16 | 16 | 66 | 12 | 60 | 23 | 36 | 5 | 72 | 17 | 36 | 11 | 8 |
| $HCO_3$, mg/l | 615 | 624 | 711 | 510 | 612 | 945 | 1036 | 805 | 891 | 710 | 797 | 740 | 705 | 587 |
| Cl, mg/l | 28 | 5.8 | 2.3 | <4 | 1.4 | <4 | 2 | <4 | 1 | <4 | 2 | <4 | 2 | 4 |
| F, mg/l | 16 | 16 | 16 | 10 | 16.7 | 10 | 18 | 10 | 18 | 10 | 18 | 10 | 17 | 17 |
| $\Sigma$Cations, meq/l | 14.38 | 11.89 | 13.46 | 11.74 | 11.98 | 19.07 | 19.71 | 17.49 | 17.61 | 15.52 | 15.31 | 13.73 | 13.31 | 10.92 |
| $\Sigma$Anions, meq/l | 14.11 | 11.74 | 13.14 | 11.09 | 11.75 | 18.42 | 19.16 | 17.11 | 17.90 | 14.57 | 14.91 | 13.86 | 13.23 | 10.89 |
| % Difference | 0.9 | 0.6 | 1.2 | 2.8 | 1.0 | 1.7 | 1.4 | 1.1 | 0.8 | 3.2 | 1.3 | 0.5 | 0.3 | 0.1 |
| $SiO_2$, mg/l | 13 | 9 | 9 | 14 | 12 | 12 | 11 | 11 | 8 | 13 | 11 | 13 | 12 | 16 |
| pH | 8.3 | 8.8 | 8.8 | N.A. | 8.8 | N.A. | 8.8 | N.A. | 8.4 | N.A. | 8.5 | N.A. | 8.5 | 8.4 |
| Calculated TDS, mg/l | 750 | 623 | 704 | 601 | 635 | 979 | 1032 | 952 | 974 | 795 | 803 | 733 | 708 | 581 |
| Conductivity, micromhos/cm | 920 | 910 | 1000 | N.A. | 800 | N.A. | 1280 | N.A. | 1260 | N.A. | 1000 | N.A. | 960 | 800 |

# TABLE 2

## ANALYSES OF DST #34, 2120-2170'

| Component | Industrial | TOSCO | CT&E |
|---|---|---|---|
| Na, mg/l | 14,000 | 15,140 | N.A. |
| K, mg/l | N.A. | 103 | N.A. |
| Ca, mg/l | <1 | 11 | N.A. |
| Mg, mg/l | 14 | 5 | N.A. |
| $SO_4$, mg/l | <4 | 18 | N.A. |
| $CO_3$, mg/l | 2,930 | 1,395 | N.A. |
| $HCO_3$, mg/l | 17,300 | 22,295 | N.A. |
| Cl, mg/l | 7,740 | 7,670 | N.A. |
| F, mg/l | 40 | 48 | 28 |
| Li, mg/l | 100 | 58 | 61 |
| $BO_2$, mg/l | 156 | 1,188*<br>1,070** | 2,800 |
| Ba, mg/l | 4.5 | N.A. | 5 |
| $\Sigma$Cations, meq/l | 624.1 | 670.1 | |
| $\Sigma$Anions, meq/l | 619.3 | 658.9 | |
| % Difference | 0.4 | 0.8 | |
| $SiO_2$, mg/l | 22 | 24 | |
| pH | 8.3 | 8.6 | |
| Calculated TDS, mg/l | 33,484 | 36,585 | |
| Conductivity, micromhos/cm | 38,000 | 39,000 | |

*Colorimetric

**Atomic Absorption

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ATLANTIC RICHFIELD COMPANY

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Page 2

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SAMPLE MARKED: Water from Tosco SG-17

ANALYSIS:

| | 1,200-1,224' | | 1,224-1,250' | |
|---|---|---|---|---|
| | milligrams per liter | milli-equivalents | milligrams per liter | milli-equivalents |
| Calcium | 9.0 | 0.449 | 22 | 1.098 |
| Magnesium | 4.3 | 0.354 | 3.6 | 0.296 |
| Sodium | 420 | 18.270 | 370 | 16.095 |
| Potassium | Less than 1 | --- | Less than 1 | --- |
| Carbonate | 60 | 1.998 | 36 | 1.199 |
| Bicarbonate | 945 | 15.498 | 805 | 13.202 |
| Chloride | Less than 4 | --- | Less than 4 | --- |
| Fluoride | 10 | 0.526 | 10 | 0.526 |
| Sulfate | Less than 4 | --- | 105 | 2.184 |
| Boron | 0.4 | --- | 1.0 | --- |
| Silicon dioxide | 12 | 0.400 | 11 | 0.366 |
| TDS (Calc.) | 979 | ΣCations = 19.07<br>ΣAnions = 18.42<br>% Diff. = 1.7 | 952 | ΣCations = 17.49<br>ΣAnions = 11.11<br>% Diff. = 1.1 |

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SAMPLE MARKED: SG 17 DST 808 feet 11/9/74

ANALYSIS:

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 4.9 | 0.245 |
| Magnesium | 0.7 | 0.058 |
| Sodium | 180 | 7.830 |
| Carbonate | Less than 0.1 | --- |
| Bicarbonate | 430 | 7.048 |
| Chloride | Less than 1 | --- |
| Sulfate | Less than 4 | --- |
| Nitrate | 1.9 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 16 | 0.532 |
| Iron | 0.63 | --- |
| Fluoride | 10 | 0.529 |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 18 | |
| Total dissolved solids (calculated) | 420 | |
| Ammonia-nitrogen | 0.5 | |
| Lithium | Less than 0.5 | |
| Barium | Less than 1.0 | |
| Hexavalent chromium | Less than 0.01 | |
| Arsenic | Less than 0.01 | |
| Selenium | Less than 0.01 | |
| Boron | 2.3 | |
| Hydroxide | Less than 0.1 | |

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | 0.15 |
| Copper | Less than 0.1 |
| Cadmium | Less than 0.01 |
| Lead | 0.22 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.05 |
| Zinc | 1.4 |

pH 7.9
Specific conductance 680 micromphos per c

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SAMPLE MARKED: SG #17 11/10 Top of Parachute 859 feet

ANALYSIS:

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 4.5 | 0.225 |
| Magnesium | 2.1 | 0.173 |
| Sodium | 180 | 7.830 |
| Carbonate | Less than 0.1 | --- |
| Bicarbonate | 440 | 7.212 |
| Chloride | 6.9 | --- |
| Sulfate | Less than 4.0 | --- |
| Nitrate | 0.4 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 17 | 0.560 |
| Iron | 1.4 | --- |
| Fluoride | 10 | 0.526 |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 20 | |
| Total dissolved solids (calculated) | 440 | |
| Ammonia-nitrogen | 0.5 | |
| Lithium | Less than 0.5 | |
| Barium | Less than 1.0 | |
| Hexavalent chromium | Less than 0.01 | |
| Arsenic | Less than 0.01 | |
| Selenium | Less than 0.01 | |
| Boron | 2.7 | |
| Hydroxide | Less than 0.1 | |

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | 0.15 |
| Copper | Less than 0.1 |
| Cadmium | Less than 0.01 |
| Lead | Less than 0.05 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.05 |
| Zinc | Less than 0.5 |

pH 8.2
Specific conductance 730 micromhos per c

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AMPLE MARKED: SG 17 DST #3 822-869 feet 11/74

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ANALYSIS:

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 5.3 | 0.264 |
| Magnesium | 1.9 | 0.156 |
| Sodium | 200 | 8.700 |
| Carbonate | Less than 0.1 | --- |
| Bicarbonate | 490 | 8.031 |
| Chloride | 6.9 | --- |
| Sulfate | Less than 4 | --- |
| Nitrate | Less than 0.1 | --- |
| Phosphate | 0.2 | --- |
| Silicon dioxide | 14 | 0.466 |
| Iron | 1.5 | --- |
| Fluoride | 11 | 0.579 |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 21 | |
| Total dissolved solids (calculated) | 500 | |
| Ammonia-nitrogen | 0.7 | |
| Lithium | Less than 0.5 | |
| Barium | Less than 1.0 | |
| Hexavalent chromium | Less than 0.01 | |
| Arsenic | Less than 0.01 | |
| Selenium | Less than 0.01 | |
| Boron | 2.3 | |
| Hydroxide | Less than 0.1 | |

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | 0.25 |
| Copper | Less than 0.1 |
| Cadmium | Less than 0.01 |
| Lead | 0.18 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.05 |
| Zinc | Less than 0.5 |

pH 7.9
Specific conductance 800 micromhos per cc

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AMPLE MARKED: SG #17 - #6DST 970-1017 feet

ANALYSIS:

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 3.3 | 0.165 |
| Magnesium | 2.6 | 0.214 |
| Sodium | 250 | 10.875 |
| Carbonate | Less than 0.1 | --- |
| Bicarbonate | 620 | 10.162 |
| Chloride | 4.1 | 0.433 |
| Sulfate | Less than 4 | --- |
| Nitrate | Less than 0.1 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 14 | 0.631 |
| Iron | 0.54 | |
| Fluoride | 12 | |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 19 | |
| Total dissolved solids (calculated) | 600 | |
| Ammonia-nitrogen | 0.7 | |
| Lithium | Less than 0.5 | |
| Barium | Less than 1 | |
| Hexavalent chromium | Less than 0.01 | |
| Arsenic | Less than 0.01 | |
| Selenium | Less than 0.01 | |
| Boron | 2.0 | |
| Hydroxide | Less than 0.1 | |

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | Less than 0.1 |
| Copper | Less than 0.1 |
| Cadmium | Less than 0.01 |
| Lead | 0.08 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.05 |
| Zinc | 0.7 |

pH 8.1
Specific conductance 950 micromhos per cc

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**MPLE MARKED:** SG 17 #7 DST 1015-1062 feet

**ANALYSIS:**

| | | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|---|
| Calcium | | 3.7 | 0.185 |
| Magnesium | | 2.1 | 0.173 |
| Sodium | | 220 | 9.570 |
| Carbonate | Less than | 0.1 | --- |
| Bicarbonate | | 580 | 9.506 |
| Chloride | | 4.1 | --- |
| Sulfate | Less than | 4.0 | --- |
| Nitrate | | 1.9 | --- |
| Phosphate | Less than | 0.1 | --- |
| Silicon dioxide | | 13 | 0.433 |
| Iron | | 0.38 | --- |
| Fluoride | | 12 | 0.635 |
| P. alkalinity, in terms of calcium carbonate | | --- | |
| MO alkalinity, in terms of calcium carbonate | | --- | |
| Hardness, in terms of calcium carbonate | | 18 | |
| Total dissolved solids (calculated) | | 540 | |
| Ammonia-nitrogen | | 0.9 | |
| Lithium | Less than | 0.5 | |
| Barium | Less than | 1.0 | |
| Hexavalent chromium | Less than | 0.01 | |
| Arsenic | Less than | 0.01 | |
| Selenium | Less than | 0.01 | |
| Boron | | 1.2 | |
| Hydroxide | Less than | 0.1 | |

| | | MILLIGRAMS PER LITER |
|---|---|---|
| Aluminum | Less than | 0.1 |
| Copper | Less than | 0.1 |
| Cadmium | Less than | 0.01 |
| Lead | | 0.76 |
| Manganese | Less than | 0.05 |
| Silver | Less than | 0.05 |
| Zinc | Less than | 0.5 |

pH 8.1
Specific conductance 910 micromhos per cc

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DATE RECEIVED: 12/6/74
DATE REPORTED: 12/20/74

LAB. NUMBER: 5249

SAMPLE MARKED: SG #17 - DST #8 1,066 feet-1,116.7 feet

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

ANALYSIS:

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 4.9 | 0.244 |
| Magnesium | 5.3 | 0.272 |
| Sodium | 315 | 13.703 |
| Carbonate | 72 | 2.398 |
| Bicarbonate | 615 | 10.086 |
| Chloride | 28 | 0.790 |
| Sulfate | Less than 4. | --- |
| Nitrate | 0.1 | --- |
| Phosphate | 0.1 | --- |
| Silicon dioxide | 13 | 0.433 |
| Iron | 0.38 | --- |
| Fluoride | 16 | 0.842 |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 26 | |
| Total dissolved solids (calculated) | 750 | |
| Ammonia-nitrogen | 0.2 | |
| Lithium | Less than 0.5 | |
| Barium | Less than 1.0 | |
| Hexavalent chromium | Less than 0.01 | |
| Arsenic | Less than 0.01 | |
| Selenium | Less than 0.01 | |
| Boron | 1.4 | |
| Aluminum | Less than 0.1 | |

| | MILLIGRAMS PER LITER |
|---|---|
| Hydroxide | Less than 0.1 |
| Copper | Less than 0.1 |
| Cadmium | Less than 0.1 |
| Lead | Less than 0.05 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.05 |
| Zinc | Less than 0.5 |
| Mercury | Less than 0.01 |

pH 8.3
Specific conductance
920 micromhos per cc

THE INDUSTRIAL LABORATORIES COMPANY

CHEMIST

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AMERICAN OIL CHEMISTS' SOCIETY
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SIGMA XI

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# THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211
ANALYSIS REPORT

TELEPHONE 455-3641

ATLANTIC RICHFIELD COMPANY
2 Park Central, Suite 555
1515 Arapahoe Street
Denver, Colorado 80202

Attn: John Matis

DATE RECEIVED: 12/13/74
DATE REPORTED: 12/26/74

LAB. NUMBER: 5440

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SAMPLE MARKED: Water from Tosco SG-17

ANALYSIS:

| | 1,180' milligrams per liter | 1,180' milli-equivalents | 1,164-1,212' milligrams per liter | 1,164-1,212' milli-equivalents |
|---|---|---|---|---|
| Calcium | 8.2 | 0.409 | 5.7 | 0.289 |
| Magnesium | 8.2 | 0.675 | 5.8 | 0.477 |
| Sodium | 245 | 10.658 | 410 | 17.835 |
| Potassium | Less than 1 | --- | Less than 1 | --- |
| Carbonate | 66 | 2.198 | 78 | 2.569 |
| Bicarbonate | 510 | 8.364 | 960 | 15.744 |
| Chloride | Less than 4 | --- | Less than 4 | --- |
| Fluoride | 10 | 0.526 | 10 | 0.526 |
| Sulfate | Less than 4 | --- | Less than 4 | --- |
| Boron | Less than 0.1 | --- | 0.3 | --- |
| Silicon dioxide | 14 | 0.466 | 12 | 0.400 |
| TDS (Calc.) | 601 | ΣCations = 11.74<br>ΣAnions = 11.09<br>% Diff. = 2.8 | 992 | ΣCations = 18.60<br>ΣAnions = 18.84<br>% Diff. = 0.6 |

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TELEPHONE 455-3641

DATE RECEIVED: 12/13/74
DATE REPORTED: 12/26/74

ATLANTIC RICHFIELD COMPANY

LAB. NUMBER: 5440
page 3

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

SAMPLE MARKED: Water from Tosco SG-17

ANALYSIS:

|  | 1,250' |  | 1,327-1,374' |  | 2,608' |  |
|---|---|---|---|---|---|---|
|  | milligrams per liter | milli-equivalents | milligrams per liter | milli-equivalents | milligrams per liter | milli-equivalents |
| Calcium | 9.0 | 0.499 | 8.2 | 0.409 | 7.4 | 0.369 |
| Magnesium | 2.8 | 0.230 | 3.3 | 0.272 | 3.8 | 0.313 |
| Sodium | 340 | 14.790 | 300 | 13.050 | 740 | 32.190 |
| Potassium | Less than 1 | --- | Less than 1 | --- | Less than 1 | --- |
| Carbonate | 72 | 2.398 | 36 | 1.199 | 96 | 3.197 |
| Bicarbonate | 710 | 11.644 | 740 | 12.136 | 1,730 | 28.372 |
| Chloride | Less than 4 | --- | Less than 4 | --- | Less than 4 | --- |
| Flouride | 10 | 0.526 | 10 | 0.526 | 10 | 0.526 |
| Sulfate | Less than 4 | --- | Less than 4 | --- | Less than 4 | --- |
| Boron | 0.2 | --- | 0.1 | --- | Less than 0.1 | --- |
| Silicon dioxide | 13 | 0.433 | 13 | 0.433 | 15 | 0.500 |
| TDS (Calc.) | 795 |  | 733 |  | 1,720 |  |
| ΣCations |  | 15.52 |  | 13.73 |  | 32.87 |
| ΣAnions |  | 14.57 |  | 13.86 |  | 32.10 |
| % Diff. |  | 3.2 |  | 0.5 |  | 1.2 |

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THE INDUSTRIAL LABORATORIES COMPANY
BY:

CHEMIST

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# THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

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TELEPHONE 455-3641

ANALYSIS REPORT

| | |
|---|---|
| DATE RECEIVED: | 1/8/75 |
| DATE REPORTED: | 1/10/75 |
| LAB. NUMBER: | 5943<br>Page 2 |

ATLANTIC RICHFIELD COMPANY

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SAMPLE MARKED: Water

ANALYSIS:

| | SG 17<br>DST 18<br>1,374' | SG 17 12/12<br>DST 28<br>1,514-1,572' | SG 17<br>DST 21 12/10<br>1,473-1,522' | SG 17 12/14<br>DST 24<br>1,561-1,622' |
|---|---|---|---|---|
| Calcium | 5.7 | 4.1 | 4.1 | 4.9 |
| Magnesium | 4.5 | 4.9 | 3.7 | 8.0 |
| Sodium | 260 | 300 | 250 | 325 |
| Potassium | Less than 1 | Less than 1 | Less than 1 | Less than 1 |
| Carbonate | Less than 0.1 | Less than 0.1 | Less than 0.1 | Less than 0.1 |
| Bicarbonate | 670 | 740 | 630 | 830 |
| Chloride | 6.9 | 13 | 7.0 | 14 |
| Fluoride | 19 | 20 | 20 | 20 |
| Sulfate | Less than 4 | Less than 4 | Less than 4 | Less than 4 |
| Boron | 1.0 | 0.2 | 0.3 | 0.5 |
| Silicon dioxide | 16 | 17 | 16 | 17 |
| TDS (Calc.) | 641 | 722 | 610 | 796 |

Figures are milligrams per liter

cc: Tosco

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J. Paul
CHEMIST

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# THE INDUSTRIAL LABORATORIES COMPANY

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TELEPHONE 455-3641

ANALYSIS REPORT

DATE RECEIVED: 1/6/75
DATE REPORTED: 1/15/75

ATLANTIC RICHFIELD COMPANY

LAB. NUMBER: 5944

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SAMPLE MARKED: Water

ANALYSIS:

| | SG 17<br>12/13<br>1,622' | SG 17<br>DST 26<br>12/12<br>1,668-1,720' | SG 17<br>DST 27<br>12/18<br>1,711-1,770' | SG 17<br>DST 28<br>1,768' |
|---|---|---|---|---|
| Calcium | 6.6 | 4.9 | 8.2 | 7.4 |
| Magnesium | 2.8 | 6.8 | 3.3 | 3.3 |
| Sodium | 280 | 590 | 940 | 960 |
| Potassium | Less than 1 | Less than 1 | Less than 1 | Less than 1 |
| Carbonate | Less than 0.1 | Less than 0.1 | 81 | Less than 0.1 |
| Bicarbonate | 700 | 1,500 | 2,170 | 2,460 |
| Chloride | 2.8 | 20 | 34 | 29 |
| Fluoride | 20 | 24 | 25 | 24 |
| Sulfate | Less than 4 | Less than 4 | Less than 4 | Less than 4 |
| Boron | 0.8 | 1.1 | 1.1 | 1.5 |
| Silicon dioxide | 15 | 17 | 15 | 14 |
| TDS (Calc.) | 671 | 1,399 | 2,171 | 2,245 |

Figures are milligrams perliter

cc: Tosco

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DATE RECEIVED: 1/6/75
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LAB. NUMBER: 5944
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SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

SAMPLE MARKED: Water

ANALYSIS: ✓

| | SG 17<br>12/20 | SG 20<br>Jetting TD | SG 20<br>Top of<br>Parachute<br>515' | SG 20<br>12/6<br>850' |
|---|---|---|---|---|
| Calcium | 4.9 | 7.4 | 7.4 | 6.6 |
| Magnesium | 3.4 | 6.2 | 3.5 | 5.2 |
| Sodium | 250 | 680 | 190 | 530 |
| Potassium | Less than 1 | Less than 1 | Less than 1 | Less than 1 |
| Carbonate | Less than 0.1 | Less than 0.1 | Less than 0.1 | Less than 0.1 |
| Bicarbonate | 620 | 1,760 | 500 | 1,380 |
| Chloride | 5.6 | 9.8 | 4.2 | 9.8 |
| Fluoride | 8.9 | 24 | 3.6 | 19 |
| Sulfate | Less than 4 | Less than 4 | 56 | 14 |
| Boron | 0.9 | 1.4 | 0.1 | 2.5 |
| Silicon dioxide | 15 | 11 | 15 | 15 |
| TDS (Calc.) | 593 | | | |

Figures are milligrams per liter

cc: Tosco

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J. Paul [illegible]

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# THE INDUSTRIAL LABORATORIES COMPANY

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ANALYSIS REPORT

TELEPHONE 455-3641

ATLANTIC RICHFIELD COMPANY

DATE RECEIVED: 1/6/75
DATE REPORTED: 1/15/75

LAB. NUMBER: 5943

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

SAMPLE MARKED: Water

| ANALYSIS: | SG 1<br>12/6<br>2,525' | SG 1<br>Para-chute | AT 1<br>12/23<br>9 AM | ✓ SG 17<br>1280-1309'<br>11/3 |
|---|---|---|---|---|
| Calcium | 20 | 16 | 16 | 7.4 |
| Magnesium | 13 | 11 | 9.5 | 5.3 |
| Sodium | 550 | 610 | 200 | 280 |
| Potassium | Less than 1 | Less than 1 | Less than 1 | Less than 1 |
| Carbonate | Less than 0.1 | Less than 0.1 | Less than 0.1 | Less than 0.1 |
| Bicarbonate | 1,280 | 1,330 | 570 | 700 |
| Chloride | 43 | 56 | 7.0 | 9.7 |
| Fluoride | 14 | 14 | 13 | 18 |
| Sulfate | 150 | 205 | Less than 4 | Less than 4 |
| Boron | 2.0 | 1.9 | 18.1 | 1.8 |
| Silicon dioxide | 13 | 13 | 15 | 12 |
| TDS (Calc.) | | | | 677 |

Figures are milligrams per liter

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CC: Tosco

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THE INDUSTRIAL LABORATORIES COMPANY
H. Paul
CHEMIST

# THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211

TELEPHONE 455-3641

ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY
2 Park Central, Suite 555
1515 Arapahoe Street
Denver, Colorado 80202

Attn: JOhn Matis

DATE RECEIVED: 1/6/75
DATE REPORTED: 1/17/75

LAB. NUMBER: 5943

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

AMPLE MARKED: Water

ANALYSIS:

| | SG 1<br>12/6<br>2,525' | SG 1<br>Para-<br>chute | AT 1<br>12/23<br>9 AM | SG 17 ✓<br>1280-1309'<br>11/3 |
|---|---|---|---|---|
| Calcium | 0.988 | 0.798 | 0.798 | 0.369 |
| Magnesium | 1.070 | 0.905 | 0.782 | 0.436 |
| Sodium | 23.925 | 26.535 | 8.700 | 12.180 |
| Bicarbonate | 20.992 | 21.812 | 9.348 | 11.480 |
| Chloride | 1.213 | 1.580 | --- | 0.274 |
| Sulfate | 3.120 | 4.264 | --- | --- |
| licon dioxide | 0.433 | 0.433 | 0.533 | 0.400 |

| | SG 17 ✓<br>DST 18<br>1;374' | SG 17 12/12 ✓<br>DST 28<br>1,514-1,572' | SG 17 ✓<br>DST 21 12/20<br>1,473-1,522' | SG 17 12/14 ✓<br>DST 24<br>1,561-1.622' |
|---|---|---|---|---|
| CAlcium | 0.284 | 0.205 | 0.205 | 0.245 |
| Magnesium | 0.370 | 0.403 | 0.304 | 0.658 |
| Sodium | 11.310 | 13.050 | 10.875 | 14.138 |
| Bicarbonate | 10.988 | 12.135 | 10.332 | 13.612 |
| Chloride | --- | 0.367 | --- | 0.395 |
| Fluoride | 0.999 | 1.052 | 1.052 | 1.052 |
| Sulfate | --- | --- | --- | --- |
| Silicon dioxide | 0.533 | 0.556 | 0.533 | 0.566 |

Figures are milli-equivalents

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ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY

DATE RECEIVED: 1/6/75
DATE REPORTED: 1/17/75

LAB. NUMBER: 5944

SUPPLEMENTAL REPORT

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

SAMPLE MARKED: Water

ANALYSIS:

| | SG 17<br>12/13<br>1,622' | SG 17<br>DST 26<br>12/12<br>1,658-1,720' | SG 17<br>DST 27<br>12/18<br>1,711-1,770' | SG 17<br>DST 28<br>1,763' |
|---|---|---|---|---|
| Calcium | 0.329 | 0.245 | 0.409 | 0.369 |
| Magnesium | 0.230 | 0.560 | 0.272 | 0.272 |
| Sodium | 12.180 | 25.665 | 40.990 | 41.730 |
| Carbonate | --- | --- | 2.697 | --- |
| Bicarbonate | 11.539 | 24.519 | 35.566 | 40.369 |
| Chloride | --- | 0.564 | 0.959 | 0.818 |
| Fluoride | 1.052 | 1.262 | 1.315 | 1.262 |
| Silicon dioxide | 0.500 | 0.566 | 0.500 | 0.466 |

| | SG 17<br>12/20 | SG 20<br>Jetting TD | SG 20<br>Top of<br>Parachute<br>515' | SG 20<br>12/6<br>850' |
|---|---|---|---|---|
| Calcium | 0.245 | 0.369 | 0.369 | 0.329 |
| Magnesium | 0.280 | 0.510 | 0.283 | 0.428 |
| Sodium | 10.875 | 29.520 | 8.265 | 23.055 |
| Bicarbonate | 10.096 | 28.845 | 8.177 | 22.595 |
| Chloride | --- | 0.276 | --- | 0.276 |
| Fluoride | 0.999 | 1.262 | --- | 0.999 |
| Sulfate | --- | --- | 1.166 | 0.291 |
| Silicon dioxide | 0.500 | 0.366 | 0.500 | 0.500 |

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*Analytical and Consulting Chemists*

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ANALYSIS REPORT

TELEPHONE 455-3641

ATLANTIC RICHFIELD COMPANY

DATE RECEIVED: 1/6/75
DATE REPORTED: 1/17/75

LAB. NUMBER: 5945

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

SAMPLE MARKED: Water

ANALYSIS:

| | DST 2<br>SG 21<br>950-1009' | SG 21<br>12/18<br>980' | SG 21<br>DST #1<br>12/19<br>1003-1035' | SG 17 ✓<br>DST 28<br>12/15<br>1616-1670' |
|---|---|---|---|---|
| Calcium | 1.697 | 0.409 | 0.369 | 0.284 |
| Magnesium | 2.715 | 3.127 | 0.592 | 0.354 |
| Sodium | 6.075 | 7.178 | 17.400 | 20.880 |
| Carbonate | --- | 0.400 | --- | 1.532 |
| Bicarbonate | 7.687 | 8.654 | 8.200 | 18.258 |
| Chloride | 0.197 | 0.158 | --- | 0.508 |
| Fluoride | --- | 0.798 | 0.842 | 1.315 |
| Sulfate | 2.603 | --- | 9.473 | 0.083 |
| Silicon dioxide | 0.634 | 0.599 | 0.435 | 0.699 |

Figures are milli-equivalents

cc: Tosco

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# THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

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ANALYSIS REPORT

TELEPHONE 455-3641

ATLANTIC RICHFIELD COMPANY
2 Park Central, Suite 555
1515 Arapahoe Street
Denver, Colorado 80202
Attn: John Matis

**DATE RECEIVED:** 1/23/75
**DATE REPORTED:** 1/30/75

**LAB. NUMBER:** 6451

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

**SAMPLE MARKED:** SG 17-DST 30 12/28

**ANALYSIS:**

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 10 | 0.499 |
| Magnesium | 4.1 | 0.377 |
| Sodium | 590 | 25.665 |
| Carbonate | 120 | 3.996 |
| Bicarbonate | 1,200 | 19.668 |
| Chloride | 22 | 0.621 |
| Sulfate | 98 | 2.040 |
| Nitrate | Less than 0.1 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 12 | 0.400 |
| Iron | Less than 0.05 | --- |
| Fluoride | 20 | 1.052 |
| P. alkalinity, in terms of calcium carbonate | 98 | |
| MO alkalinity, in terms of calcium carbonate | 980 | |
| Hardness, in terms of calcium carbonate | 42 | |
| Total dissolved solids (calculated) | 1,480 | |
| Boron | 1.8 | |
| pH 8.4 | | |

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ASS'N OF OFFICIAL RACING CHEMISTS
BAKERY ENGINEERS OF AMERICA
INSTITUTE OF FOOD TECHNOLOGY
SIGMA XI

II B-108

THE INDUSTRIAL LABORATORIES COMPANY
Paul Vcka
CHEMIST

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# THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211
TELEPHONE 455-3641

ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY
John Matis

DATE RECEIVED: 1/23/75
DATE REPORTED: 1/30/75

LAB. NUMBER: 6452

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

AMPLE MARKED: SG17 - DST 31 12/30 1,918-1,970 Feet

ANALYSIS:

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 16 | 0.798 |
| Magnesium | 2.9 | 0.239 |
| Sodium | 1,100 | 47.850 |
| Carbonate | 360 | 11.988 |
| Bicarbonate | 1,850 | 30.322 |
| Chloride | 36 | 1.016 |
| Sulfate | 82 | 2.527 |
| Nitrate | Less than 0.1 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 16 | 0.533 |
| Iron | 0.08 | --- |
| Fluoride | 45 | 2.367 |
| P. alkalinity, in terms of calcium carbonate | 295 | |
| MO alkalinity, in terms of calcium carbonate | 1,520 | |
| Hardness, in terms of calcium carbonate | 52 | |
| Total dissolved solids (calculated) | 2,590 | |
| Boron | 0.9 | |

pH 8.9

MBERS OF:

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THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211

TELEPHONE 455-3641

ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY
2 Park Central, Suite 555
1515 Arapahoe Street
Denver, Colorado 80202
Attn: John Matis

DATE RECEIVED: 1/23/75
DATE REPORTED: 2/11/75

LAB. NUMBER: 6454

CORRECTED COPIES

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE REPORT UNLESS WE ARE REQUESTED, IN WRITI TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMM IATELY UNLESS CLIENT HAS REQUESTED SPECIA HANDLING (FREEZING, ECT.) IN ADVANCE.

SAMPLE MARKED: SG 17 - DST 34 1/4/74 (?) 2120-2170'

ANALYSIS:

| | milligrams per liter |
|---|---|
| Fluoride | 40 |
| Boron | 47 |
| Lithium | 100 |
| Barium | 4.5 |

cc: Frank Haas

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H. Paul Ochs

CHEMIST

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THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211
TELEPHONE 455-3641

ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY

DATE RECEIVED:
DATE REPORTED: 2/11/75
LAB. NUMBER:

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE C
REPORT UNLESS WE ARE REQUESTED, IN WRITI
TO RETAIN THEM FOR A LONGER PERIOD. PERI
ABLE SAMPLES ARE USUALLY DISCARDED IMME
IATELY UNLESS CLIENT HAS REQUESTED SPEC
HANDLING (FREEZING, ECT.) IN ADVANCE.

SAMPLE MARKED:

ANALYSIS:

NOTE: The Dianthrimide method for boron is the U.S.G.S. "Techniques of Water Resources Investigations" supplied by the U.S.G.S, Salt Lake City office.

Enclosed are the corrected results for lab #6454. A retest of lab #6452 for fluoride was 48 milligrams per liter.

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# THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211
TELEPHONE 455-3641

ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY
John Matis

DATE RECEIVED: 1/23/75
DATE REPORTED: 1/29/75

LAB. NUMBER: 6454

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

SAMPLE MARKED: SG 17 - DST 34 1/4/74(?) 2,120-2,170 feet

ANALYSIS:

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | Less than 1 | --- |
| Magnesium | 14 | 1.152 |
| Sodium | 14,000 | 609.000 |
| Carbonate | 2,930 | 97.569 |
| Bicarbonate | 17,300 | 282.891 |
| Chloride | 7,740 | 218.345 |
| Sulfate | Less than 4 | --- |
| Nitrate | 1,260 | 20.304 |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 22 | 0.732 |
| Iron | 3.6 | --- |
| Fluoride | 3.2 | --- |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 56 | |
| Total dissolved solids (calculated) | 34,400 | |
| Boron | 3.8 | |
| Lithium | Less than 1 | |
| Barium | Less than 1 | |
| Hexavalent chromium | Less than 0.01 | |
| Arsenic | Less than 0.01 | |
| Selenium | Less than 0.01 | |
| Aluminum | 1.4 | |
| Hydroxide | Less than 1 | |

| | MILLIGRAMS PER LITER |
|---|---|
| Cadmium | 0.06 |
| Copper | 0.03 |
| Manganese | 0.04 |
| Silver | Less than 0.01 |
| Zinc | 0.1 |
| Lead | 0.81 |
| Ammonia-nitrogen | 137 |

pH 8.3

Specific conductance
38,000 micromhos per cc

THE INDUSTRIAL LABORATORIES COMPANY

CHEMIST

MEMBERS OF:

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SIGMA XI

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, Colorado 80401

Date: 9 January 75

Analyst: S. Sweeney

P. O. No.:

Sample No.: ARCO et al #17 Dst. Dept. 808
11/9/74

IAD No.: 97-183-002-12

CONCENTRATION IN µg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | 0.002 |
| Thorium | | Gadolinium | | Molybdenum | 0.03 | Titanium | 0.1 |
| Bismuth | | Europium | | Niobium | | Scandium | 0.002 |
| Lead | 0.2 | Samarium | | Zirconium | | Calcium | * |
| Thallium | | Neodymium | | Yttrium | | Potassium | * |
| Mercury | NR | Praseodymium | | Strontium | 0.3 | Chlorine | * |
| Gold | | Cerium | | Rubidium | 0.009 | Sulfur | * |
| Platinum | | Lanthanum | | Bromine | 0.03 | Phosphorus | 2 |
| Iridium | | Barium | ≤0.03 | Selenium | 0.2 | Silicon | * |
| Osmium | | Cesium | | Arsenic | 0.008 | Aluminum | 1 |
| Rhenium | | Iodine | 0.006 | Germanium | 0.007 | Magnesium | * |
| Tungsten | | Tellurium | | Gallium | 0.003 | Sodium | * |
| Tantalum | | Antimony | | Zinc | 0.4 | Fluorine | * |
| Hafnium | | Tin | | Copper | 0.2 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 0.03 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | 0.004 | Carbon | NR |
| Thulium | | Silver | | Iron | 0.5 | Boron | 0.04 |
| Erbium | | Palladium | | Manganese | 0.2 | Beryllium | 0.003 |
| Holmium | | Rhodium | | Chromium | 0.01 | Lithium | 0.8 |
| Dysprosium | | | | | | Hydrogen | NR |

NR — Not Reported
All elements not reported <0.003 µg/ml
* Not reported upon request

Approved:

# COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 • AREA CODE 312 726-8434

Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, CO 80401

Date: 9 January 75

Analyst: S. Sweeney

P. O. No.:

Sample No.: ARCO et al SG #17 #7 Dst 1017'-1062'

IAD No.: 97-183-002-12

CONCENTRATION IN μg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | <0.001 |
| Thorium | | Gadolinium | | Molybdenum | 0.02 | Titanium | 0.07 |
| Bismuth | | Europium | | Niobium | | Scandium | <0.001 |
| Lead | 0.02 | Samarium | | Zirconium | | Calcium | * |
| Thallium | | Neodymium | | Yttrium | | Potassium | * |
| Mercury | 21 *** | Praseodymium | | Strontium | 0.09 | Chlorine | * |
| Gold | | Cerium | | Rubidium | 0.002 | Sulfur | * |
| Platinum | | Lanthanum | | Bromine | 0.006 | Phosphorus | 0.09 |
| Iridium | | Barium | 0.02 | Selenium | 0.1 | Silicon | * |
| Osmium | | Cesium | | Arsenic | 0.1 | Aluminum | 7 |
| Rhenium | | Iodine | | Germanium | | Magnesium | * |
| Tungsten | | Tellurium | | Gallium | 0.002 | Sodium | * |
| Tantalum | | Antimony | | Zinc | 0.2 | Fluorine | * |
| Hafnium | | Tin | | Copper | 0.2 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 0.002 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | 0.001 | Carbon | NR |
| Thulium | | Silver | | Iron | 0.3 | Boron | 0.07 |
| Erbium | | Palladium | | Manganese | 0.1** | Beryllium | |
| Holmium | | Rhodium | | Chromium | 0.003 | Lithium | 0.3 |
| Dysprosium | | | | | | Hydrogen | NR |

NR — Not Reported

All elements not reported <0.002 μg/ml

*Not reported upon request

**Heterogeneous *** Flameless Atomic Absorption

II B-114

Approved:

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, Colorado 80401

Date: 12 February75

Analyst: S. Sweeney

P. O. No.: CORRECTED COPY
Sample No.: ARCO etal Sg #17 Dst #8 1066-1116.7

IAD No.: 97-190-002-03

CONCENTRATION IN µg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | <0.001 |
| Thorium | | Gadolinium | | Molybdenum | 0.02 | Titanium | 0.3 |
| Bismuth | | Europium | | Niobium | | Scandium | 0.002 |
| Lead | 0.3 | Samarium | | Zirconium | | Calcium | * |
| Thallium | | Neodymium | | Yttrium | | Potassium | * |
| Mercury | NR | Praseodymium | | Strontium | 0.4 | Chlorine | * |
| Gold | | Cerium | | Rubidium | 0.01 | Sulfur | * |
| Platinum | | Lanthanum | | Bromine | 0.02 | Phosphorus | 0.3 |
| Iridium | | Barium | 0.03 | Selenium | 0.03 | Silicon | * |
| Osmium | | Cesium | 0.001 | Arsenic | 0.02 | Aluminum | 0.7 |
| Rhenium | | Iodine | 0.002 | Germanium | 0.002 | Magnesium | * |
| Tungsten | 0.008 | Tellurium | 0.01 | Gallium | | Sodium | * |
| Tantalum | | Antimony | | Zinc | 0.2 | Fluorine | * |
| Hafnium | | Tin | | Copper | 0.08 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 0.008 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | 0.008 | Carbon | NR |
| Thulium | | Silver | | Iron | 0.5 | Boron | 0.2 |
| Erbium | | Palladium | | Manganese | 0.06 | Beryllium | <0.001 |
| Holmium | | Rhodium | | Chromium | 0.006 | Lithium | 0.01** |
| Dysprosium | | | | | | Hydrogen | NR |

* Not reported upon request
** Atomic Absorption
NR -- Not Reported
All elements not reported <0.002 µg/ml

Approved: M Jacobs

**COMMERCIAL TESTING & ENGINEERING CO.**

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 • AREA CODE 312 726-8434

Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, Colorado 80401

(1) Flameless Atomic Absorption
(2) Specific Ion Electrode
(3) ~~Atomic Absorption~~ Emission

Date: 25 February 75

Analyst: S. Sweeney

Sample No.: SG #17 Environmental Sample
Dst. #34 2120'-2170' 1-4-74

IAD No.: 97-229-002-05

CONCENTRATION IN µg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | 0.3 |
| Thorium | | Gadolinium | | Molybdenum | 0.04 | Titanium | 0.09 |
| Bismuth | | Europium | | Niobium | | Scandium | 0.06 |
| Lead | 0.6 | Samarium | | Zirconium | 0.6 | Calcium | ** |
| Thallium | | Neodymium | | Yttrium | | Potassium | ** |
| Mercury | (1) 0.0001 | Praseodymium | | Strontium | 3 | Chlorine | (2) 1050 |
| Gold | | Cerium | ≤0.04 | Rubidium | 0.4 | Sulfur | ** |
| Platinum | | Lanthanum | ≤0.04 | Bromine | 1 | Phosphorus | 1 |
| Iridium | | Barium | 5 | Selenium | | Silicon | ** |
| Osmium | | Cesium | ≤0.04 | Arsenic | 0.1 | Aluminum | 0.9 |
| Rhenium | | Iodine | 0.8 | Germanium | 0.1 | Magnesium | ** |
| Tungsten | | Tellurium | | Gallium | ≤0.06 | Sodium | ** |
| Tantalum | | Antimony | 0.02 | Zinc | 8 | Fluorine | (2) 28 |
| Hafnium | | Tin | | Copper | 0.2 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | * | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | 0.02 | Carbon | NR |
| Thulium | | Silver | | Iron | 7 | Boron | (3) 740 |
| Erbium | | Palladium | | Manganese | 0.3 | Beryllium | 0.003 |
| Holmium | | Rhodium | | Chromium | 0.2 | Lithium | (3) 61 |
| Dysprosium | | | | | | Hydrogen | NR |

* Molecular Interference
** Not reported upon request

NR — Not Reported
All elements not reported <0.006 µg/ml

Approved: M Jacobs

CABLE ADDRESS COMTECO

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 • AREA CODE 312 726-8434

SINCE 1908

Reply to
Instrumental Analysis Division
14335 West 44th Avenue
Golden, Colorado 80401

Phone: 303-278-9521

9 January 75

Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, CO  80401

RE: IAD #97-183-002-12

## Analytical Report

| | TOC*<br>mg/liter |
|---|---|
| Environmental Cb-4 (11-17-74) | -1 |
| Environmental Cb-2 (11-16-74) | -1 |
| Environmental Cb-1 (11-18-74) | 1 |
| ARCO SG #1 above Base "A" grove @ 970' | -1 |
| ARCO et al SG #1 @ 1105' Base mine Zone | -1 |
| ✓ ARCO et al SG #17 #7 Dst. 1017'-1062' | -1 |
| ARCO et al SG #8 Btm of mining zone @ 1013' | -1 |
| Top of parachute cr @ 706 | -1 |
| ARCO et al SG #8 971-Top of mining zone (11-4-74) | -1 |
| SG #1 @ 613' | -1 |
| ARCO SG #8 600' 1600 mΩ 10-26-74 | -1 |
| ✓ ARCO et al #17 Dst Depth 808' (11-9-74) | 6 |

*Test performed on water make "Regular".
Minus sign indicates less than reported value.

M L Jacobs
M. L. Jacobs, Ph.D.
Divisional Manager

MLJ/hb

CABLE ADDRESS COMTE

COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434

SINCE 1908

Reply to
Instrumental Analysis Division
14335 West 44th Avenue
Golden, Colorado 80401

Phone: 303-278-9521

10 January 75

Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, CO 80401

RE: IAD #97-190-002-03

Analytical Report

| | TOC* mg/Liter |
|---|---|
| Environmental Sg #9 - String #1 | <1 |
| Environmental Sg #9 - String #2 | 8 |
| ARCO etal Sg #17 - Dst #8 1066-1116.7 | 2 |

*Test performed on water marked "Regular"
Outside laboratory

M. L. Jacobs, Ph.D.
Divisional Manager

MLJ/hb

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Reply to
Instrumental Analysis Division
14335 West 44th Avenue
Golden, Colorado 80401

Phone: 303-278-9521

25 February 75

Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, Colorado 80401

Analytical Report

| | TOC*<br>mg/liter |
|---|---|
| SG #17 Environmental Sample<br>Dst. #34 2120'-2170' 1-4-74 | 117 |

| | DOC*<br>mg/liter |
|---|---|
| SG #17 Environmental Sample<br>Dst. #34 2120'-2170' 1-4-74 | 112 |

* Test performed on sample marked "Regular"
Outside laboratory

M L Jacobs
M. L. Jacobs, Ph.D.
Divisional Manager

MLJ/dh

AMERICAN COUNCIL OF INDEPENDENT LABORATORIES INC.

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HAZEN RESEARCH, INC.
4601 Indiana Street
Golden, Colorado 80401

Mr. Frank C. Haas
The Oil Shale Corporation
18200 West Highway 72
Golden, Colorado 80401

| | |
|---|---|
| Date: January 2, 1975 | |
| HRI Project No. | 535 |
| HRI Series No. | 7655 |
| Samples received: | Nov. 27, 1974 |

# REPORT OF ANALYSIS

| Analysis No. | Sample Designation | pCi/l | | | pCi/l | | | pCi/l | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | α Total | ± | α Precision* | β Total | ± | β Precision* | $Ra^{226}$ | ± | Precision* |
| 7655-1 | Arco et al SG#10-1105 Base Mine Zone | 9.7 | ± | 2.6 | 0 | ± | 8 | 0.3 | ± | 0.4 |
| -2 | Environmental Cb-1 11/18 | 4.3 | ± | 5.5 | 0 | ± | 25 | 0.1 | ± | 0.4 |
| -3 | Arco et al SG#8 Bottom of Mining zone @ 1013 | 3.4 | ± | 2.6 | 0 | ± | 11 | | | |
| -4 | Arco SG#1 Above Base "A" Grove @ 970 | 0 | ± | 1.6 | 0 | ± | 7 | | | |
| -5 | Environmental Cb-2 11/16 | 1.8 | ± | 2.3 | 0 | ± | 9 | | | |
| -6 | Top of Parachute @ 706 | 0.4 | ± | 1.6 | 0 | ± | 8 | | | |
| -7 | Arco et al SG#17, #7 DST 1015-1062 | 4.5 | ± | 2.0 | 0 | ± | 8 | 0.3 | ± | 0.5 |
| -8 | SG#1-613 | 11 | ± | 3 | 0 | ± | 8 | 0 | ± | 0.4 |
| -9 | Arco et al SG#17 DST Depth 808 11/9 | 1.3 | ± | 1.5 | 0 | ± | 8 | | | |
| -10 | Environmental Cb-4 11/17 | 1.0 | ± | 1.5 | 0 | ± | 8 | | | |
| -11 | Arco et al SG#8 Depth 971 Top of Mining Zone 11/4 | 0.8 | ± | 2.5 | 0 | ± | 11 | | | |
| -12 | Arco SG#8 600 ft. 1600 ml 10/26 | 2.6 | ± | 2.0 | 0 | ± | 8 | | | |

*Variability of the radioactive disintegration process (counting error) at the 95% confidence level, 1.96σ

By:
John C. Jarvis
Manager, Analytical Laboratory

ljb

HAZEN RESEARCH, INC.
4601 Indiana Street
Golden, Colorado 80401

Mr. Frank C. Haas
The Oil Shale Corporation
18200 West Highway 72
Golden, Colorado 80401

Date: February 6, 1975
HRI Project No. 535
HRI Series No. 7726
Samples received: Dec. 16, 1974

# REPORT OF ANALYSIS

| Analysis No. | Sample Designation | pCi/l | | | pCi/l | | | pCi/l | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | α Total | ± | α Precision* | β Total | ± | β Precision* | $Ra^{226}$ | ± | Precision* |
| 7726-1 | SG#17 DST#8 1066-1116.7 | 1.7 | ± | 1.9 | 15 | ± | 10 | | | |
| -2 | SG-9 String #1 | 4.5 | ± | 2.8 | 0 | ± | 10 | 0 | ± | 1.1 |
| -3 | SG-9 String #2 | 2.3 | ± | 2.6 | 2 | ± | 11 | | | |

*Variability of the radioactive disintegration process (counting error) at the 95% confidence level, 1.96$\sigma$

By:
John C. Jarvis
Manager, Analytical Laboratory

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ljb

**HAZEN RESEARCH, INC.**

4601 INDIANA STREET
GOLDEN, COLORADO • 80401
TELEPHONE 303/279-4501

Mr. Frank C. Haas
The Oil Shale Corporation
18200 West Highway 72
Golden, Colorado 80401

February 20, 1975

HRI Project No. 535
HRI Series No. 7836
Sample Rec'd Jan. 23, 1975

| Determination | 7836-1<br>SG #17 Environmental Sample<br>D.S.T.#34 |
|---|---|
| α-Total (pCi/l) | 0 |
| α-Precision*(pCi/l) | ±55 |
| β-Total (pCi/l) | 0 |
| β-Precision*(pCi/l) | ±320 |

*Variability of the radioactive disintegration process (counting error) at the 95% confidence level, 1.96σ

By:
John C. Jarvis
Manager, Analytical Laboratory

ljb

NOTE: Error (Precision) on this sample is high due primarily to the large concentration of soluable salts in the sample and the very small aliquot (2.0 ml) required to keep weight of soluable salts in the planchet being counted within range of standards. To compensate, the alpha was counted for 10 hours and the beta for 8 hours. The values given ~~to~~ for total alpha and total beta are considered quite reliable and the analysis of Radium 226, Thorium 230, and Uranium were considered not needed.

THE OIL SHALE CORPORATION
INTER OFFICE MEMORANDUM

LOS ANGELES ☐
DENVER ☐
GOLDEN ☒
NEW YORK ☐

LABORATORY DATA LETTER 75-47

FROM: F. C. Haas
TO: File
DATE: March 4, 1975
FILE NO.: 5100-3
SUBJECT: Analyses of Water Samples from Core Hole SG-8

Project 197

Seven water samples were taken while coring Core Hole SG-8. All samples were analyzed for major constituents and five had a comprehensive analysis done. Major constituent analysis was done by Industrial Laboratories, Denver, Colorado, and TOSCO, Rocky Flats. Minor constituent analysis was done by Industrial Laboratories. Trace metals and total organic carbon was done by Commercial Testing & Engineering Co., Golden, Colorado. Radioactivity was done by Hazen Research, Inc., Golden, Colorado.

There are two discrepancies in the major constituent analyses: (1) On the sample from #2 Jetting at 950' Industrial Laboratories reports 5.5 mg/l Cl where TOSCO found 51 mg/l Cl; (2) On the lower aquifer Industrial Laboratories reports boron of 7 mg/l as $BO_2$ where TOSCO found 162 mg/l $BO_2$. Spark source mass spectroscopy by CT&E reported greater than $10^2$ mg/l boron.

Total organic carbon in all samples was less than 10 mg/l.

Gross alpha in one of the samples was greater than 4 p Ci/l; Ra226 was determined and found to be less than 4 p Ci/l.

FCH
FCH/as
Enc.

Approved (MTA)

cc: R. G. Vawter
B. L. Schulman
H. M. Spence
T. H. Cleveland
A. W. Schillinger
M. W. Legatski
D. B. Tait
J. R. Matis

## TABLE 1

## MAJOR CONSTITUENT ANALYSES, SG-8

| Component | 600' | | 971' Top of M. Z. | | Bottom of M. Z. | Top of Garden Gulch, 2117' | TD 2608' | Jetting #2 950' | | Lower Aquifer, 1910' | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ind. | TOSCO | Ind. | TOSCO | Ind. | TOSCO | TOSCO | Ind. | TOSCO | Ind. | TOSCO |
| Na, mg/l | 170 | 209 | 350 | 470 | 180 | 724 | 784 | 690 | 660 | 2600 | 2380 |
| K, mg/l | N.A. | 0.4 | N.A. | 0.6 | N.A. | 1.8 | 0.9 | N.A. | 1.3 | N.A. | 14 |
| Ca, mg/l | 23 | 18 | 6.6 | 6 | 7.4 | 4.5 | 3.3 | 12 | 6 | 12 | 6 |
| Mg, mg/l | 33 | 32 | 7.7 | 5 | 5.5 | 2.6 | 1.5 | 12 | 4 | 1.5 | 4 |
| $SO_4$, mg/l | 85 | 115 | < 4 | < 4 | < 4 | 23 | 14 | 2.5 | < 4 | 3 | < 4 |
| $CO_3$, mg/l | < 0.1 | 18 | < 0.1 | 38 | 6 | 55 | 42 | 72 | 62 | 96 | 252 |
| $HCO_3$, mg/l | 510 | 479 | 1010 | 1027 | 500 | 1632 | 1808 | 1740 | 1558 | 5210 | 4056 |
| Cl, mg/l | 6.9 | 4 | 6.9 | 5 | 5.5 | 18 | 19 | 5.5 | 51 | 840 | 867 |
| F, mg/l | 9.2 | 4.5 | 12 | 21 | 10 | 20 | 21 | 12 | 18 | 20 | 23 |
| Li, mg/l | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | N.A. | N.A. | 0.6 | 0.5 | 6.6 | 6.8 |
| $BO_2$, mg/l | 2.5 | 1.1 | < 0.5 | 4 | 9.0 | N.A. | N.A. | 14 | 10 | 7 | 162 |
| Cations, meq/l | 11.26 | 12.63 | 16.18 | 21.16 | 8.65 | 31.96 | 34.38 | 31.59 | 29.36 | 114.7 | 105.4 |
| Anions, meq/l | 10.87 | 11.22 | 17.38 | 19.44 | 9.08 | 30.63 | 33.01 | 32.09 | 30.22 | 113.6 | 104.4 |
| % Difference | 1.8 | 5.8 | 3.6 | 4.2 | 2.4 | 2.1 | 2.0 | 0.8 | 1.4 | 0.5 | 0.5 |
| $SiO_2$, mg/l | 19 | 18 | 11 | 10 | 11 | 13 | 14 | 12 | 11 | 17 | 13 |
| pH | 8.1 | 9.0 | 8.1 | 9.0 | 8.3 | 8.9 | 8.8 | 8.5 | 8.7 | 8.4 | 9.2 |
| Calculated TDS, mg/l | 599 | 655 | 889 | 1063 | 479 | 1662 | 1786 | 1685 | 1587 | 6156 | 5717 |
| Conductivity, micromhos/cm | 990 | 1040 | 1650 | 1670 | 1550 | 2300 | 2300 | 2500 | 2400 | 9200 | 9600 |

# THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211
TELEPHONE 455-3641

ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY
John Matis

DATE RECEIVED: 11/26/74
DATE REPORTED: 12/9/74

LAB. NUMBER: 5005

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE

.SS
AMPLE MARKED: ~~S~~0 #8 600 feet 10/26

ANALYSIS:

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 23 | 1.148 |
| Magnesium | 33 | 2.715 |
| Sodium | 170 | 7.395 |
| Carbonate | Less than 0.1 | --- |
| Bicarbonate | 510 | 8.358 |
| Chloride | 6.9 | --- |
| Sulfate | 85 | 1.768 |
| Nitrate | 0.6 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 19 | 0.633 |
| Iron | 0.11 | --- |
| Fluoride | 9.2 | 0.484 |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 190 | |
| Total dissolved solids (calculated) | 600 | |
| Ammonia-nitrogen | 0.3 | |
| Lithium | Less than 0.5 | |
| Barium | Less than 1.0 | |
| Hexavalent chromium | Less than 0.01 | |
| Arsenic | Less than 0.01 | |
| Selenium | Less than 0.01 | |
| Boron | 2.5 | |
| Hydroxide | Less than 0.1 | |

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | Less than 0.1 |
| Copper | Less than 0.1 |
| Cadmium | Less than 0.01 |
| Lead | Less than 0.05 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.05 |
| Zinc | Less than 0.5 |

pH 8.1
Specific conductance
990 micromhos per cc

THE INDUSTRIAL LABORATORIES COMPANY
H. Paul Ochs
CHEMIST

MBE OF:

AMERICAN ASS'N OF CEREAL CHEMISTS
AMERICAN CHEMICAL SOCIETY
AMERICAN OIL CHEMISTS' SOCIETY
ASS'N OF OFFICIAL RACING CHEMISTS
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SIGMA XI

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*Analytical and Consulting Chemists*

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DENVER, COLORADO 80211
ANALYSIS REPORT

TELEPHONE 455-3641

DATE RECEIVED: 11/26/74
DATE REPORTED: 12/9/74

LAB. NUMBER: 5006

ATLANTIC RICHFIELD COMPANY
John Matis

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

56

AMPLE MARKED: Et Al #8 971 feet Top 11/4

ANALYSIS:

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 6.6 | 0.329 |
| Magnesium | 7.7 | 0.634 |
| Sodium | 350 | 16.530 |
| Carbonate | Less than 0.1 | --- |
| Bicarbonate | 1,010 | 16.554 |
| Chloride | 6.9 | --- |
| Sulfate | Less than 4 | --- |
| Nitrate | 0.3 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 11 | 0.366 |
| Iron | Less than 0.05 | ---- |
| Fluoride | 12 | 0.631 |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 48 | |
| Total dissolved solids (calculated) | 940 | |
| Ammonia-nitrogen | 1.1 | |
| Lithium | Less than 0.5 | |
| Barium | Less than 1 | |
| Hexavalent chromium | Less than 0.01 | |
| Arsenic | 0.02 | |
| Selenium | Less than 0.01 | |
| Boron | Less than 0.5 | |
| Hydroxide | Less than 0.1 | |

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | Less than 0.1 |
| Copper | Less than 0.1 |
| Cadmium | Less than 0.01 |
| Lead | Less than0.05 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.05 |
| Zinc | Less than 0.5 |

pH 8.1
Specific conductance
1,650 micromhos per cc

THE INDUSTRIAL LABORATORIES COMPANY
H. Paul
CHEMIST

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**ANALYSIS REPORT**

ATLANTIC RICHFIELD COMPANY
John Matis

DATE RECEIVED: 11/26/74
DATE REPORTED: 12/9/74

LAB. NUMBER: 5015

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

AMPLE MARKED: SG #8 11/5 Bottom of Mining Zone

ANALYSIS:

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 7.4 | 0.369 |
| Magnesium | 5.5 | 0.453 |
| Sodium | 180 | 7.830 |
| Carbonate | 6 | --- |
| Bicarbonate | 500 | 8.195 |
| Chloride | 5.5 | 0.366 |
| Sulfate | Less than 4.0 | --- |
| Nitrate | Less than 0.1 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 11 | 0.526 |
| Iron | 0.05 | |
| Fluoride | 10 | |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 41 | |
| Total dissolved solids (calculated) | 330 | |
| Ammonia-nitrogen | 0.5 | |
| Lithium | Less than 0.5 | |
| Barium | Less than 1.0 | |
| Hexavalent chromium | Less than 0.01 | |
| Arsenic | Less than 0.01 | |
| Selenium | Less than 0.01 | |
| Boron | 2.3 | |
| Hydroxide | Less than 0.1 | |

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | Less than 0.1 |
| Copper | Less than 0.1 |
| Cadmium | Less than 0.01 |
| Lead | Less than 0.05 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.05 |
| Zinc | Less than 0.5 |

| | |
|---|---|
| pH | 8.3 |
| Specific conductance | 1,550 micromhos per cc |

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# THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

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ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY

DATE RECEIVED: 1/6/75
DATE REPORTED: 1/15/75

LAB. NUMBER: 5941

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

SAMPLE MARKED: SG #8 12/12/74 950# Jetting #2

ANALYSIS:

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 12 | 0.599 |
| Magnesium | 12 | 0.988 |
| Sodium (by flame) | 690 | 30.015 |
| Carbonate | 72 | 2.398 |
| Bicarbonate | 1,740 | 28.536 |
| Chloride | 5.5 | 0.155 |
| Sulfate | 2.5 | 0.052 |
| Nitrate | 0.2 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 12 | 0.400 |
| Iron | 0.31 | --- |
| Fluoride | 12 | 0.643 |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 80 | |
| Total dissolved solids (calculated) | 1,670 | |
| Ammonia-nitrogen | 3.3 | |
| Lithium | 0.6 | |
| Barium | Less than 1.0 | |
| Hexavalent chromium | Less than 0.05 | |
| Arsenic | 0.01 | |
| Selenium | Less than 0.01 | |
| Boron | 3.6 | |
| Hydroxide | Less than 0.1 | |

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | Less than 0.1 |
| Copper | Less than 0.1 |
| Cadmium | 0.5 |
| Lead | Less than 0.05 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.05 |
| Zinc | Less than 0.5 |
| Mercury | Less than 0.01 |

pH 8.5
Specific conductance 2,500 micromhos per cc

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cc: Tosco

THE INDUSTRIAL LABORATORIES COMPANY
H. Paul Ochs
CHEMIST

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# THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

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DENVER, COLORADO 80211
ANALYSIS REPORT

TELEPHONE 455-3641

ATLANTIC RICHFIELD COMPANY

DATE RECEIVED: 1/6/75
DATE REPORTED: 1/15/75

LAB. NUMBER: 5942

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

SAMPLE MARKED: SG #3 1,910 Feet 8 AM

ANALYSIS:

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 12 | 0.599 |
| Magnesium | 1.5 | 0.123 |
| Sodium (by flame) | 2,600 | 113.100 |
| Carbonate | 96 | 3.197 |
| Bicarbonate | 5,210 | 85.444 |
| Chloride | 840 | 23.575 |
| Sulfate | 3.0 | 0.062 |
| Nitrate | 0.3 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 17 | 0.600 |
| Iron | 0.34 | --- |
| Fluoride | 20 | 1.072 |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 36 | |
| Total dissolved solids (calculated) | 6,130 | |
| Ammonia-nitrogen | 24 | |
| Lithium | 6.6 | |
| Barium | Less than 1.0 | |
| Hexavalent chromium | Less than 0.05 | |
| Arsenic | Less than 0.01 | |
| Selenium | Less than 0.01 | |
| Boron | 1.8 | |
| Hydroxide | Less than 0.1 | |

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | Less than 0.1 |
| Copper | Less than 0.1 |
| Cadmium | 0.04 |
| Lead | 0.07 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.05 |
| Zinc | Less than 0.5 |
| Mercury | Less than 0.01 |

pH 8.4
Specific conductance 9,200 micromhos per cc

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BAKERY ENGINEERS OF AMERICA
INSTITUTE OF FOOD TECHNOLOGY
SIGMA XI

cc: Tosco

THE INDUSTRIAL LABORATORIES COMPANY
H. Paul Ocks
CHEMIST

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COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, Colorado 80401

Date: 9 January 75

Analyst: S. Sweeney

P. O. No.:

Sample No.: ARCO SG #8 600' 1600 mΩ
10/26/74

IAD No.: 97-183-002-12

CONCENTRATION IN μg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | |
| Thorium | | Gadolinium | | Molybdenum | 0.02 | Titanium | 0.1 |
| Bismuth | | Europium | | Niobium | | Scandium | |
| Lead | ≤0.02 | Samarium | | Zirconium | | Calcium | * |
| Thallium | | Neodymium | | Yttrium | | Potassium | * |
| Mercury | NR | Praseodymium | | Strontium | 0.7 | Chlorine | * |
| Gold | | Cerium | | Rubidium | | Sulfur | * |
| Platinum | | Lanthanum | | Bromine | 0.009 | Phosphorus | 0.1 |
| Iridium | | Barium | 0.03 | Selenium | | Silicon | * |
| Osmium | | Cesium | 0.003 | Arsenic | 0.004 | Aluminum | 0.1 |
| Rhenium | | Iodine | | Germanium | | Magnesium | * |
| Tungsten | | Tellurium | | Gallium | | Sodium | * |
| Tantalum | | Antimony | | Zinc | 0.01 | Fluorine | * |
| Hafnium | | Tin | | Copper | 0.03 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 0.007 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | | Carbon | NR |
| Thulium | | Silver | | Iron | 0.05 | Boron | 0.04 |
| Erbium | | Palladium | | Manganese | 0.009 | Beryllium | |
| Holmium | | Rhodium | | Chromium | 0.005 | Lithium | 0.3 |
| Dysprosium | | | | | | Hydrogen | NR |

NR — Not Reported
All elements not reported <0.004 μg/ml
* Not reported upon request

Approved:

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, Colorado 80401

Date: 9 January 75

Analyst: S. Sweeney

P. O. No.:

Sample No.: ARCO et al SG #8 971
Top of mining zone
11/4/74

IAD No.: 97-183-002-12

CONCENTRATION IN µg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | <0.001 |
| Thorium | | Gadolinium | | Molybdenum | 0.02 | Titanium | 0.2 |
| Bismuth | | Europium | | Niobium | | Scandium | <0.001 |
| Lead | ≤0.01 | Samarium | | Zirconium | | Calcium | * |
| Thallium | | Neodymium | | Yttrium | | Potassium | * |
| Mercury | NR | Praseodymium | | Strontium | 2 | Chlorine | * |
| Gold | | Cerium | | Rubidium | 0.01 | Sulfur | * |
| Platinum | | Lanthanum | | Bromine | 0.03 | Phosphorus | 0.3 |
| Iridium | | Barium | 0.2 | Selenium | 0.003 | Silicon | * |
| Osmium | | Cesium | 0.006 | Arsenic | 0.05 | Aluminum | 0.2 |
| Rhenium | | Iodine | 0.004 | Germanium | | Magnesium | * |
| Tungsten | | Tellurium | | Gallium | | Sodium | * |
| Tantalum | | Antimony | | Zinc | 0.02 | Fluorine | * |
| Hafnium | | Tin | | Copper | 0.04 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 0.04 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | 0.02 | Carbon | NR |
| Thulium | | Silver | 0.004 | Iron | 0.06 | Boron | 1 |
| Erbium | | Palladium | | Manganese | 0.01 | Beryllium | |
| Holmium | | Rhodium | | Chromium | 0.01 | Lithium | 3 |
| Dysprosium | | | | | | Hydrogen | NR |

NR — Not Reported
All elements not reported <0.002 µg/ml
* Not reported upon request

Approved:

**COMMERCIAL TESTING & ENGINEERING CO.**
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, Colorado 80401

Date: 9 January 75

Analyst: S. Sweeney

P. O. No.:

Sample No.: ARCO et al SG #8 Bottom of mining zone @ 1013'

IAD No.: 97-183-002-12

CONCENTRATION IN μg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | 0.005 |
| Thorium | | Gadolinium | | Molybdenum | 0.03 | Titanium | 0.2 |
| Bismuth | | Europium | | Niobium | | Scandium | 0.02 |
| Lead | ≤0.01 | Samarium | | Zirconium | | Calcium | * |
| Thallium | | Neodymium | | Yttrium | | Potassium | * |
| Mercury | NR | Praseodymium | | Strontium | 2 | Chlorine | * |
| Gold | | Cerium | | Rubidium | 0.02 | Sulfur | * |
| Platinum | | Lanthanum | | Bromine | 0.06 | Phosphorus | 0.3 |
| Iridium | | Barium | 0.8 | Selenium | | Silicon | * |
| Osmium | | Cesium | 0.01 | Arsenic | 0.1 | Aluminum | 2 |
| Rhenium | | Iodine | 0.004 | Germanium | | Magnesium | * |
| Tungsten | | Tellurium | | Gallium | 0.002 | Sodium | * |
| Tantalum | | Antimony | 0.002 | Zinc | 0.1 | Fluorine | * |
| Hafnium | | Tin | | Copper | 0.08 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 0.04 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | 0.01 | Carbon | NR |
| Thulium | | Silver | | Iron | 0.3 | Boron | 0.5 |
| Erbium | | Palladium | | Manganese | 0.05 | Beryllium | 0.004 |
| Holmium | | Rhodium | | Chromium | 0.006 | Lithium | 3 |
| Dysprosium | | | | | | Hydrogen | NR |

NR — Not Reported
All elements not reported <0.002 μg/ml
* Not reported upon request

II B-132

Approved:

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. Frank Haas
The Oil Shale Corp.
18200 West Hiway 72
Golden, CO 80401

Date: 3 February 75

Analyst: S. Sweeney

P. O. No.:

SG-8

Sample No.: ARCO environmental upper aquifer - conductivity 2500 mµ-Pkr set @ 950' - Jetting #2 Filtrate

IAD No.: 97-210-002-06

CONCENTRATION IN µg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | 0.01 |
| Thorium | | Gadolinium | | Molybdenum | 0.03 | Titanium | 0.05 |
| Bismuth | | Europium | | Niobium | | Scandium | 0.002 |
| Lead | ≤0.02 | Samarium | | Zirconium | 0.006 | Calcium | * |
| Thallium | | Neodymium | | Yttrium | | Potassium | * |
| Mercury | NR | Praseodymium | | Strontium | 0.7 | Chlorine | * |
| Gold | | Cerium | | Rubidium | 0.02 | Sulfur | * |
| Platinum | | Lanthanum | | Bromine | 0.08 | Phosphorus | 0.1 |
| Iridium | | Barium | 0.7 | Selenium | | Silicon | * |
| Osmium | | Cesium | 0.005 | Arsenic | 0.03 | Aluminum | 0.2 |
| Rhenium | | Iodine | 0.02 | Germanium | 0.005 | Magnesium | * |
| Tungsten | | Tellurium | | Gallium | 0.01 | Sodium | * |
| Tantalum | | Antimony | | Zinc | 0.3 | Fluorine | * |
| Hafnium | | Tin | | Copper | 0.02 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 0.03 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | ≤0.02 | Carbon | NR |
| Thulium | | Silver | | Iron | 0.4 | Boron | 2 |
| Erbium | | Palladium | | Manganese | 0.004 | Beryllium | |
| Holmium | | Rhodium | | Chromium | 0.02 | Lithium | 5 |
| Dysprosium | | | | | | Hydrogen | NR |

NR — Not Reported
All elements not reported <0. 004 µg/ml II B-133
*Not reported upon request

Approved: M Jacobs

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. Frank Haas
The Oil Shale Corp.
18200 West Hiway 72
Golden, CO 80401

Date: 3 February 75

Analyst: S. Sweeney

P. O. No.:

SG-8

Sample No.: Pkr set at 1910' conductivity 8000 mμ
temp. 29.5°C
Filtrate

IAD No.: 97-210-002-06

CONCENTRATION IN μg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | 0.01 |
| Thorium | | Gadolinium | | Molybdenum | 0.03 | Titanium | 0.1 |
| Bismuth | | Europium | | Niobium | 0.002 | Scandium | 0.002 |
| Lead | 0.02 | Samarium | | Zirconium | 0.03 | Calcium | * |
| Thallium | | Neodymium | | Yttrium | 0.002 | Potassium | * |
| Mercury | NR | Praseodymium | | Strontium | 1 | Chlorine | * |
| Gold | | Cerium | | Rubidium | 0.09 | Sulfur | * |
| Platinum | | Lanthanum | 0.004 | Bromine | 2 | Phosphorus | 0.6 |
| Iridium | | Barium | 2 | Selenium | | Silicon | * |
| Osmium | | Cesium | 0.2 | Arsenic | 0.03 | Aluminum | 0.2 |
| Rhenium | | Iodine | 0.7 | Germanium | 0.007 | Magnesium | * |
| Tungsten | | Tellurium | | Gallium | 0.004 | Sodium | * |
| Tantalum | | Antimony | | Zinc | 0.1 | Fluorine | * |
| Hafnium | | Tin | | Copper | 0.02 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 0.2 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | ≤0.01 | Carbon | NR |
| Thulium | | Silver | | Iron | 0.2 | Boron | >10 |
| Erbium | | Palladium | | Manganese | 0.09 | Beryllium | <0.001 |
| Holmium | | Rhodium | | Chromium | 0.01 | Lithium | >10 |
| Dysprosium | | | | | | Hydrogen | NR |

NR — Not Reported
All elements not reported <0. 004 μg/ml II B-134
*Not reported upon request

Approved: M J Jacobs

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GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434

SINCE 1908

Reply to
Instrumental Analysis Division
14335 West 44th Avenue
Golden, Colorado 80401

Phone: 303-278-9521

3 February 75

Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, CO 80401

Re: IAD #97-210-002-06

| | Analytical Report | TOC* mg/liter |
|---|---|---|
| 1) | ARCO environmental sample SG-1 Lower Aquifer<br>SG-1 Pkr set @ 1930' | 3 |
| ✓ 2) | ARCO environmental upper aquifer - conductivity<br>2500 mμ - Pkr set @ 950' - 12/17/74<br>Temp. 25.5°C Jetting #2 SG-8 | <1 |
| ✓ 3) | ARCO environmental sample lower aquifer SG-8<br>Pkr set @ 1910' conductivity 8000 mμ<br>Temp. 29.5°C | 3 |

*Test performed on water marked "Regular"
Outside Laboratory

M. L. Jacobs

M. L. Jacobs, Ph.D.
Divisional Manager

MLJ/hb

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COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434

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Reply to
Instrumental Analysis Division
14335 West 44th Avenue
Golden, Colorado 80401

Phone: 303-278-9521

9 January 75

Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, CO 80401

RE: IAD #97-183-002-12

Analytical Report

| | TOC* mg/liter |
|---|---|
| Environmental Cb-4 (11-17-74) | -1 |
| Environmental Cb-2 (11-16-74) | -1 |
| Environmental Cb-1 (11-18-74) | 1 |
| ARCO SG #1 above Base "A" grove @ 970' | -1 |
| ARCO et al SG #1 @ 1105' Base mine Zone | -1 |
| ARCO et al SG #17 #7 Dst. 1017'-1062' | -1 |
| ✓ ARCO et al SG #8 Btm of mining zone @ 1013' | -1 |
| Top of parachute cr @ 706 | -1 |
| ✓ ARCO et al SG #8 971-Top of mining zone (11-4-74) | -1 |
| SG #1 @ 613' | -1 |
| ✓ ARCO SG #8 600' 1600 mΩ 10-26-74 | -1 |
| ARCO et al #17 Dst Depth 808' (11-9-74) | 6 |

*Test performed on water make "Regular".
Minus sign indicates less than reported value.

M L Jacobs
M. L. Jacobs, Ph.D.
Divisional Manager

MLJ/hb

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HAZEN RESEARCH, INC.
4601 Indiana Street
Golden, Colorado 80401

Mr. Frank C. Haas
The Oil Shale Corporation
18200 West Highway 72
Golden, Colorado 80401

Date: January 2, 1975
HRI Project No. 535
HRI Series No. 7655
Samples received: Nov. 27, 1974

## REPORT OF ANALYSIS

| Analysis No. | Sample Designation | α | pCi/1 | α | β | pCi/1 | β | | pCi/1 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Total | ± | Precision* | Total | ± | Precision* | $Ra^{226}$ | ± | Precision* |
| 7655-1 | Arco et al SG#10-1105 Base Mine Zone | 9.7 | ± | 2.6 | 0 | ± | 8 | 0.3 | ± | 0.4 |
| -2 | Environmental Cb-1 11/18 | 4.3 | ± | 5.5 | 0 | ± | 25 | 0.1 | ± | 0.4 |
| ✓ -3 | Arco et al SG#8 Bottom of Mining zone @ 1013 | 3.4 | ± | 2.6 | 0 | ± | 11 | | | |
| -4 | Arco SG#1 Above Base "A" Grove @ 970 | 0 | ± | 1.6 | 0 | ± | 7 | | | |
| -5 | Environmental Cb-2 11/16 | 1.8 | ± | 2.3 | 0 | ± | 9 | | | |
| -6 | Top of Parachute @ 706 | 0.4 | ± | 1.6 | 0 | ± | 8 | | | |
| -7 | Arco et al SG#17, #7 DST 1015-1062 | 4.5 | ± | 2.0 | 0 | ± | 8 | 0.3 | ± | 0.5 |
| -8 | SG#1-613 | 11 | ± | 3 | 0 | ± | 8 | 0 | ± | 0.4 |
| -9 | Arco et al SG#17 DST Depth 808 11/9 | 1.3 | ± | 1.5 | 0 | ± | 8 | | | |
| -10 | Environmental Cb-4 11/17 | 1.0 | ± | 1.5 | 0 | ± | 8 | | | |
| ✓ -11 | Arco et al SG#8 Depth 971 Top of Mining Zone 11/4 | 0.8 | ± | 2.5 | 0 | ± | 11 | | | |
| ✓ -12 | Arco SG#8 600 ft. 1600 ml 10/26 | 2.6 | ± | 2.0 | 0 | ± | 8 | | | |

*Variability of the radioactive disintegration process (counting error) at the 95% confidence level, 1.96σ

By: John C. Jarvis
John C. Jarvis
Manager, Analytical Laboratory

ljb

HAZEN RESEARCH, INC.
4601 Indiana Street
Golden, Colorado 80401

Mr. Frank Haas
The Oil Shale Corporation
18200 West Highway 72
Golden, Colorado 80401

Date: February 19, 1975
HRI Project No. 535
HRI Series No. 7791
Samples received Jan. 6, 1975
P.O. Number

## REPORT OF ANALYSIS

| Analysis No. | Sample Designation | pCi/l α Total | α ± Precision** | pCi/l β Total | β ± Precision** |
|---|---|---|---|---|---|
| 7791-1* | 212-83 | 17 | ±3 | 0 | ±10 |
| -2* ✓ | ARCO Environmental Sample Lower Aquifer SG-8 | 24 | ±15 | 0 | ±69 |
| -3* | ARCO Environmental Sample Lower Aquifer SG-11 | 28 | ±17 | 0 | ±74 |
| -4 ✓ | ARCO Environmental Sample Upper Aquifer Setting 2, SG-8 | 2.1 | ±3.7 | 0 | ±16 |

By: John C. Jarvis
John C. Jarvis
Manager, Analytical Laboratory

ljb

*$Ra^{226}$ Analysis in progress; results to follow at a later date.

**Variability of the radioactive disintegration process (counting error) at the 95% confidence level, 1.96$\sigma$

HAZEN RESEARCH, INC.

4601 INDIANA STREET
GOLDEN, COLORADO • 80401
TELEPHONE 303/279-4501

## REPORT OF ANALYSIS

Supplement to report dated February 19, 1975

Mr. Frank C. Haas
The Oil Shale Corporation
18200 West Highway 72
Golden, Colorado 80401

Date: February 27, 1975

HRI Project No. 535
HRI Series No. 7791
Samples Rec'd 1/6/75

| Analysis No. | Sample Designation | pCi/l<br>$Ra^{226}$ | ± | Precision* |
|---|---|---|---|---|
| 7791-1 | 212-83 | 8.4 | ± | 3.8 |
| -2 | ARCO Environmental Sample Lower Aquifer SG-8 | 2.7 | ± | 2.2 |
| -3 | ARCO Environmental Sample Upper Aquifer SG-11 | 3.0 | ± | 1.9 |

By: Richard P Ohl for
John C. Jarvis
Manager, Analytical Laboratory

*Variability of the radioactive disintegration process (counting error) at the 95% confidence level, 1.96$\sigma$

amb

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RESEARCH AND DEVELOPMENT FOR THE CHEMICAL AND MINERAL INDUSTRIES

THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211
TELEPHONE 455-3641

**ANALYSIS REPORT**

ATLANTIC RICHFIELD COMPANY
2 Park Central, Suite 555
1515 Arapahoe Street
Denver, Colorado 80202

Attn: John Matis

**DATE RECEIVED:** 11/26/74
**DATE REPORTED:** 3/7/75

**LAB. NUMBER:** 5015

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

**SAMPLE MARKED:** SG #8 11/5 Bottom of Mining Zone

**ANALYSIS:**

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 8.2 | 0.409 |
| Magnesium | 6.7 | 0.551 |
| Sodium | 840 | 36.540 |
| Carbonate | 7.0 | 0.400 |
| Bicarbonate | 2,245 | 36.796 |
| Chloride | 10 | 0.282 |
| Sulfate | Less than 4.0 | --- |
| Nitrate | Less than 0.1 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 11 | 0.366 |
| Iron | 0.05 | --- |
| Fluoride | 10 | 0.526 |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 44 | |
| Total dissolved solids (calculated) | 2,000 | |
| Ammonia-nitrogen | 0.5 | |
| Lithium | Less than 0.5 | |
| Barium | Less than 1.0 | |
| Hexavalent chromium | Less than 0.01 | |
| Arsenic | Less than 0.01 | |
| Selenium | Less than 0.01 | |
| Boron | 2.3 | |
| Hydroxide | Less than 0.1 | |

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | Less than 0.1 |
| Copper | Less than 0.1 |
| Cadmium | Less than 0.01 |
| Lead | Less than 0.05 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.05 |
| Zinc | Less than 0.5 |

pH 8.3
Specific conductance 1,800 micromhos per c

THE INDUSTRIAL LABORATORIES COMPANY
H. Paul Ochs
CHEMIST

II B-140

MEMBERS OF:

AMERICAN ASS'N OF CEREAL CHEMISTS
AMERICAN CHEMICAL SOCIETY
AMERICAN OIL CHEMISTS' SOCIETY
ASS'N OF OFFICIAL RACING CHEMISTS
BAKERY ENGINEERS OF AMERICA
INSTITUTE OF FOOD TECHNOLOGY
SIGMA XI

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THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211

TELEPHONE 455-3641

**ANALYSIS REPORT**

ATLANTIC RICHFIELD COMPANY
2 Park Central, Suite 555
1515 Arapahoe Street
Denver, Colorado 80202
Attn: John Matis

**DATE RECEIVED:** 11/26/74
**DATE REPORTED:** 3/11/75

**LAB. NUMBER:** 5015

SUPPLEMENTAL REPORT

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ECT.) IN ADVANCE.

**SAMPLE MARKED:** SG #8 11/5 Bottom of Mining Zone

**ANALYSIS:**

| | |
|---|---|
| MO alkalinity, in terms of calcium carbonate | 1,830 milligrams per liter |

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THE INDUSTRIAL LABORATORIES COMPANY

H. Paul Ochs

CHEMIST

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# THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211
TELEPHONE 455-3641

ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY
John Matis

|  |  |
|---|---|
| DATE RECEIVED: | 11/26/74 |
| DATE REPORTED: | 12/9/74 |
| LAB. NUMBER: | 5015 |

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

SAMPLE MARKED: SG #8 11/5 Bottom of Mining Zone

ANALYSIS:

|  | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 7.4 | 0.369 |
| Magnesium | 5.5 | 0.453 |
| Sodium | 180 | 7.830 |
| Carbonate | 6 | --- |
| Bicarbonate | 500 | 8.195 |
| Chloride | 5.5 | 0.366 |
| Sulfate | Less than 4.0 | --- |
| Nitrate | Less than 0.1 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 11 | 0.526 |
| Iron | 0.05 |  |
| Fluoride | 10 |  |
| P. alkalinity, in terms of calcium carbonate | --- |  |
| MO alkalinity, in terms of calcium carbonate | --- |  |
| Hardness, in terms of calcium carbonate | 41 |  |
| Total dissolved solids (calculated) | 330<br>472 |  |
| Ammonia-nitrogen | 0.5 |  |
| Lithium | Less than 0.5 |  |
| Barium | Less than 1.0 |  |
| Hexavalent chromium | Less than 0.01 |  |
| Arsenic | Less than 0.01 |  |
| Selenium | Less than 0.01 |  |
| Boron | 2.3 |  |
| Hydroxide | Less than 0.1 |  |

|  | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | Less than 0.1 |
| Copper | Less than 0.1 |
| Cadmium | Less than 0.01 |
| Lead | Less than 0.05 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.05 |
| Zinc | Less than 0.5 |

|  |  |
|---|---|
| pH | 8.3 |
| Specific conductance | 1,550 micromhos per cc |

THE INDUSTRIAL LABORATORIES COMPANY
H. Paul
CHEMIST

II B-142

EMB[illegible] OF:

AMERICAN ASS'N OF CEREAL CHEMISTS
AMERICAN CHEMICAL SOCIETY
AMERICAN OIL CHEMISTS' SOCIETY
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SIGMA XI

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# THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211
ANALYSIS REPORT

TELEPHONE 455-3641

ATLANTIC RICHFIELD COMPANY

**DATE RECEIVED:** 1/6/75
**DATE REPORTED:** 1/15/75

**LAB. NUMBER:** 5942

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC) IN ADVANCE.

**SAMPLE MARKED:** SG #8 1,910 Feet 8 AM

**ANALYSIS:**

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 12 | 0.599 |
| Magnesium | 1.5 | 0.123 |
| Sodium (by flame) | 2,600 | 113.100 |
| Carbonate | 96 | 3.197 |
| Bicarbonate | 5,210 | 85.444 |
| Chloride | 840 | 23.575 |
| Sulfate | 3.0 | 0.062 |
| Nitrate | 0.3 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 17 | 0.600 |
| Iron | 0.34 | --- |
| Fluoride | 20 | 1.072 |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 36 | |
| Total dissolved solids (calculated) | 6,130 | |
| Ammonia-nitrogen | 24 | |
| Lithium | 6.6 | |
| Barium | Less than 1.0 | |
| Hexavalent chromium | Less than 0.05 | |
| Arsenic | Less than 0.01 | |
| Selenium | Less than 0.01 | |
| Boron | 1.8 | |
| Hydroxide | Less than 0.1 | |

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | Less than 0.1 |
| Copper | Less than 0.1 |
| Cadmium | 0.04 |
| Lead | 0.07 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.05 |
| Zinc | Less than 0.5 |
| Mercury | Less than 0.01 |

pH 8.4
Specific conductance 9,200 micromhos per cc

THE INDUSTRIAL LABORATORIES COMPANY

CHEMIST

cc: Tosco

II B-143

EMBERS OF:

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SIGMA XI

THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211

TELEPHONE 455-3641

ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY

DATE RECEIVED: 1/6/75
DATE REPORTED: 1/15/75

LAB. NUMBER: 5941

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

SAMPLE MARKED: SG #8 12/12/74 950# Jetting #2

ANALYSIS:

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 12 | 0.599 |
| Magnesium | 12 | 0.988 |
| Sodium (by flame) | 690 | 30.015 |
| Carbonate | 72 | 2.398 |
| Bicarbonate | 1,740 | 28.536 |
| Chloride | 5.5 | 0.155 |
| Sulfate | 2.5 | 0.052 |
| Nitrate | 0.2 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 12 | 0.400 |
| Iron | 0.31 | --- |
| Fluoride | 12 | 0.643 |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 80 | |
| Total dissolved solids (calculated) | 1,670 | |
| Ammonia-nitrogen | 3.3 | |
| Lithium | 0.6 | |
| Barium | Less than 1.0 | |
| Hexavalent chromium | Less than 0.05 | |
| Arsenic | 0.01 | |
| Selenium | Less than 0.01 | |
| Boron | 3.6 | |
| Hydroxide | Less than 0.1 | |

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | Less than 0.1 |
| Copper | Less than 0.1 |
| Cadmium | 0.5 |
| Lead | Less than 0.05 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.05 |
| Zinc | Less than 0.5 |
| Mercury | Less than 0.01 |

pH 8.5
Specific conductance 2,500 micromhos per cc

THE INDUSTRIAL LABORATORIES COMPANY
J. Paul Ochs
CHEMIST

cc: Tosco

II B-144

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THE INDUSTRIAL LABORATORIES COMPANY
*Analytical and Consulting Chemists*
2600 WEST 29TH AVENUE
DENVER, COLORADO 80211
TELEPHONE 455-3641

ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY
John Matis

| | |
|---|---|
| **DATE RECEIVED:** | 11/26/74 |
| **DATE REPORTED:** | 12/9/74 |
| **LAB. NUMBER:** | 5006 |

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE

56
AMPLE MARKED: Et Al #8 971 feet Top 11/4

ANALYSIS:

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 6.6 | 0.329 |
| Magnesium | 7.7 | 0.634 |
| Sodium | 350 | 16.530 |
| Carbonate | Less than 0.1 | --- |
| Bicarbonate | 1,010 | 16.554 |
| Chloride | 6.9 | --- |
| Sulfate | Less than 4 | --- |
| Nitrate | 0.3 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 11 | 0.366 |
| Iron | Less than 0.05 | ---- |
| Fluoride | 12 | 0.631 |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 48 | |
| Total dissolved solids (calculated) | 940 | |
| Ammonia-nitrogen | 1.1 | |
| Lithium | Less than 0.5 | |
| Barium | Less than 1 | |
| Hexavalent chromium | Less than 0.01 | |
| Arsenic | 0.02 | |
| Selenium | Less than 0.01 | |
| Boron | Less than 0.5 | |
| Hydroxide | Less than 0.1 | |

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | Less than 0.1 |
| Copper | Less than 0.1 |
| Cadmium | Less than 0.01 |
| Lead | Less than0.05 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.05 |
| Zinc | Less than 0.5 |

pH 8.1
Specific conductance
1,650 micromhos per cc

THE INDUSTRIAL LABORATORIES COMPANY
H. Paul
CHEMIST

MBERS OF:
AMERICAN ASS'N OF CEREAL CHEMISTS
AMERICAN CHEMICAL SOCIETY
AMERICAN OIL CHEMISTS' SOCIETY
ASS'N OF OFFICIAL RACING CHEMISTS
BAKERY ENGINEERS OF AMERICA
INSTITUTE OF FOOD TECHNOLOGY
SIGMA XI

S REPORT IS NOT TO BE REPRODUCED, IN WHOLE OR IN PART, FOR ADVERTISING PURPOSES WITHOUT OBTAINING PRIOR WRITTEN AUTHORIZATION

# THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211
ANALYSIS REPORT

TELEPHONE 455-3641

**DATE RECEIVED:** 11/26/74
**DATE REPORTED:** 12/9/74

**LAB. NUMBER:** 5005

ATLANTIC RICHFIELD COMPANY
John Matis

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE

SS
**SAMPLE MARKED:** ~~S~~0 #8 600 feet 10/26

**ANALYSIS:**

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 23 | 1.148 |
| Magnesium | 33 | 2.715 |
| Sodium | 170 | 7.395 |
| Carbonate | Less than 0.1 | --- |
| Bicarbonate | 510 | 8.358 |
| Chloride | 6.9 | --- |
| Sulfate | 85 | 1.768 |
| Nitrate | 0.6 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 19 | 0.633 |
| Iron | 0.11 | --- |
| Fluoride | 9.2 | 0.484 |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 190 | |
| Total dissolved solids (calculated) | 600 | |
| Ammonia-nitrogen | 0.3 | |
| Lithium | Less than 0.5 | |
| Barium | Less than 1.0 | |
| Hexavalent chromium | Less than 0.01 | |
| Arsenic | Less than 0.01 | |
| Selenium | Less than 0.01 | |
| Boron | 2.5 | |
| Hydroxide | Less than 0.1 | |

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | Less than 0.1 |
| Copper | Less than 0.1 |
| Cadmium | Less than 0.01 |
| Lead | Less than 0.05 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.05 |
| Zinc | Less than 0.5 |

pH 8.1
Specific conductance
990 micromhos per cc

EMB[illegible] OF:
AMERICAN ASS'N OF CEREAL CHEMISTS
AMERICAN CHEMICAL SOCIETY
AMERICAN OIL CHEMISTS' SOCIETY
ASS'N OF OFFICIAL RACING CHEMISTS
BAKERY ENGINEERS OF AMERICA
INSTITUTE OF FOOD TECHNOLOGY
SIGMA XI

II B-146

THE INDUSTRIAL LABORATORIES COMPANY
H. Paul Ochs
CHEMIST

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Water Quality - Baseline

## II B-5

## BASELINE GROUND WATER QUALITY DATA

Several wells or core holes have been drilled, completed and sampled as part of the ground water baseline monitoring network. The analyses of some of those initial baseline samples are included in this segment of Quarterly Report #2. Some data appeared in Quarterly Report #1 as upper zone samples during drilling, alluvial well samples, and mnoitoring samples. In the future, most ground water analystical data will appear in the Baseline Water Quality Section of the quarterly reports. Drilling activity, and hence drilling water data, will be greatly reduced in 1975.

On a semi-annual basis ground water samples will be collected from all appropriate well bores and analyzed for baseline documentation. The constituent list may change from time to time as criteria are reviewed and modified.

The Project is now five months into the first year of baseline documentation. Therefore, in April (extending into May) the next major ground water sampling run will commence. Data from that sampling run may or may not be available for Quarterly Report #3, depending on analytical lag time. Until those samples are collected and analyzed, detailed ground water quality interpretation and/or correlation, based upon the baseline ground water monitoring network, would be inappropriate.

TABLE II B5.1

## WATER QUALITY ANALYSIS
## ENVIRONMENTAL BASELINE MONITORING

**Well Number:** Cb-1

| Date | | 11-18-74 | | | | |
|---|---|---|---|---|---|---|
| 1. | Aluminum (ug/1) | .05 | | | | |
| 2. | Ammonia (mg/1) | 2.1 | | | | |
| 3. | Arsenic (ug/1) | .002 | | | | |
| 4 | Barium (ug/1) | .08 | | | | |
| 5. | Beryllium (ug/1) | < .002 | | | | |
| 6. | Bicarbonate (mg/1) | 2570 | | | | |
| 7. | Bismuth (ug/1) | < .002 | | | | |
| 8. | Boron (ug/1) | .7 | | | | |
| 9. | Cadmium (ug/1) | < .002 | | | | |
| 10. | Calcium (mg/1) | 9.4 | | | | |
| 11. | Carbonate (mg/1) | <.1 | | | | |
| 12. | Cerium (mg/1) | <.002 | | | | |
| 13. | Chloride (mg/1) | 82 | | | | |
| 14. | Chrome, Hexavalent | .006 | | | | |
| 15. | Cobalt (ug/1) | .01 | | | | |
| 16. | Conductivity, Specific (u℧) | 3800 | | | | |
| 17. | Copper (ug/1) | .09 | | | | |
| 18. | Fluoride (mg/1) | 16 | | | | |
| 19. | Gallium (ug/1) | <.002 | | | | |
| 20. | Hardness, Total | 35 | | | | |
| 21. | Hydroxide (mg/1) | < .1 | | | | |
| 22. | Iron (ug/1) | .3 | | | | |
| 23. | Lead (ug/1) | <.008 | | | | |
| 24. | Lithium (ug/1) | .3 | | | | |
| 25. | Magnesium (mg/1) | 8.2 | | | | |
| 26. | Manganese (ug/1) | .2 | | | | |
| 27. | Mercury (ug/1) | – | | | | |
| 28. | Molybdenum (ug/1) | .02 | | | | |
| 29. | Nickel (ug/1) | .009 | | | | |
| 30. | Nitrate (mg/1) | .5 | | | | |
| 31. | pH | 8.2 | | | | |
| 32. | Phosphate, Total | < .1 | | | | |
| 33. | Potassium (mg/1) | 9 | | | | |
| 34. | Selenium (ug/1) | < .002 | | | | |
| 35. | Silica (mg/1) | 11 | | | | |
| (*)36. | Silver (ug/1) | <.002 | | | | |
| 37. | Sodium (mg/1) | 980 | | | | |
| 38. | Solids, Dissolved (mg/1) | 2366 | | | | |
| 39. | Strontium (ug/1) | .4 | | | | |
| 40. | Sulfate (mg/1) | < 4 | | | | |
| 41. | Titanium (ug/1) | .05 | | | | |
| 42. | Vanadium (ug/1) | .002 | | | | |
| 43. | Yttrium (mg/1) | < .002 | | | | |
| 44. | Zinc (ug/1) | .04 | | | | |
| 45. | Zirconium (ug/1) | <.002 | | | | |
| 46. | Radioactivity | | | | | |
| | Gross Alpha (pcl) | 4.3 | | | | |
| | Radium 226* | 0.1 | | | | |
| | Gross Beta (pcl) | 0 | | | | |
| | Thorium 230** | | | | | |
| | Uranium** | | | | | |
| 47. | Total Organic Carbon (TOC)<br>If TOC >10 mg1/1 then measure | | | | | |
| | Dissolved Organic Carbon | <1 | | | | |
| | Suspended Organic Carbon | | | | | |
| | Phenols | | | | | |
| | Sulfur, Acid Extract | | | | | |
| | Nitrogen, Base Extract | | | | | |

(*) Not required

* Required if gross alpha is greater than 4 picocuries per liter (pcl).

** Required if gross beta is greater than 100 picocuries per liter (pcl).

TABLE II B5.2

# WATER QUALITY ANALYSIS
# ENVIRONMENTAL BASELINE MONITORING

Well Number: Cb-2

| Date | | 11-16-74 | | | | |
|---|---|---|---|---|---|---|
| 1. | Aluminum (ug/l) | .15 | | | | |
| 2. | Ammonia (mg/l) | .5 | | | | |
| 3. | Arsenic (ug/l) | .02 | | | | |
| 4 | Barium (ug/l) | .04 | | | | |
| 5. | Beryllium (ug/l) | < .001 | | | | |
| 6. | Bicarbonate (mg/l) | 450 | | | | |
| 7. | Bismuth (ug/l) | .005 | | | | |
| 8. | Boron (ug/l) | 2.9 | | | | |
| 9. | Cadmium (ug/l) | <.002 | | | | |
| 10. | Calcium (mg/l) | 8.2 | | | | |
| 11. | Carbonate (mg/l) | 3.6 | | | | |
| 12. | Cerium (mg/l) | <.002 | | | | |
| 13. | Chloride (mg/l) | 9.6 | | | | |
| 14. | Chrome, Hexavalent | .03 | | | | |
| 15. | Cobalt (ug/l) | .002 | | | | |
| 16. | Conductivity, Specific (u℧) | 1600 | | | | |
| 17. | Copper (ug/l) | 3 | | | | |
| 18. | Fluoride (mg/l) | 2.9 | | | | |
| 19. | Gallium (ug/l) | .003 | | | | |
| 20. | Hardness, Total | 39 | | | | |
| 21. | Hydroxide (mg/l) | < .1 | | | | |
| 22. | Iron (ug/l) | .5 | | | | |
| 23. | Lead (ug/l) | .02 | | | | |
| 24. | Lithium (ug/l) | 3 | | | | |
| 25. | Magnesium (mg/l) | 4.5 | | | | |
| 26. | Manganese (ug/l) | .1 | | | | |
| 27. | Mercury (ug/l) | – | | | | |
| 28. | Molybdenum (ug/l) | .04 | | | | |
| 29. | Nickel (ug/l) | .02 | | | | |
| 30. | Nitrate (mg/l) | .3 | | | | |
| 31. | pH | 8.4 | | | | |
| 32. | Phosphate, Total | < .1 | | | | |
| 33. | Potassium (mg/l) | 3.0 | | | | |
| 34. | Selenium (ug/l) | <.002 | | | | |
| 35. | Silica (mg/l) | 17 | | | | |
| (*)36. | Silver (ug/l) | <.002 | | | | |
| 37. | Sodium (mg/l) | 350 | | | | |
| 38. | Solids, Dissolved (mg/l) | 976 | | | | |
| 39. | Strontium (ug/l) | .7 | | | | |
| 40. | Sulfate (mg/l) | 360 | | | | |
| 41. | Titanium (ug/l) | .07 | | | | |
| 42. | Vanadium (ug/l) | .002 | | | | |
| 43. | Yttrium (mg/l) | <.002 | | | | |
| 44. | Zinc (ug/l) | .4 | | | | |
| 45. | Zirconium (ug/l) | < .002 | | | | |
| 46. | Radioactivity | | | | | |
| | Gross Alpha (pcl) | 1.8 | | | | |
| | Radium 226* | | | | | |
| | Gross Beta (pcl) | 0 | | | | |
| | Thorium 230** | | | | | |
| | Uranium** | | | | | |
| 47. | Total Organic Carbon (TOC)<br>If TOC > 10 mg1/1 then measure | | | | | |
| | Dissolved Organic Carbon | < 1 | | | | |
| | Suspended Organic Carbon | | | | | |
| | Phenols | | | | | |
| | Sulfur, Acid Extract | | | | | |
| | Nitrogen, Base Extract | | | | | |

(*) Not required

* Required if gross alpha is greater than 4 picocuries per liter (pcl).

** Required if gross beta is greater than 100 picocuries per liter (pcl).

TABLE II B5.3

WATER QUALITY ANALYSIS
ENVIRONMENTAL BASELINE MONITORING

**Well Number:** Cb-4

| Date | | 11-17-74 | | | | |
|---|---|---|---|---|---|---|
| 1. | Aluminum (ug/l) | e | | | | |
| 2. | Ammonia (mg/l) | .4 | | | | |
| 3. | Arsenic (ug/l) | .01 | | | | |
| 4 | Barium (ug/l) | .02 | | | | |
| 5. | Beryllium (ug/l) | < .001 | | | | |
| 6. | Bicarbonate (mg/l) | 360 | | | | |
| 7. | Bismuth (ug/l) | <.002 | | | | |
| 8. | Boron (ug/l) | 2.8 | | | | |
| 9. | Cadmium (ug/l) | <.002 | | | | |
| 10. | Calcium (mg/l) | 30 | | | | |
| 11. | Carbonate (mg/l) | <.1 | | | | |
| 12. | Cerium (mg/l) | <.002 | | | | |
| 13. | Chloride (mg/l) | 6.9 | | | | |
| 14. | Chrome, Hexavalent | .03 | | | | |
| 15. | Cobalt (ug/l) | < .002 | | | | |
| 16. | Conductivity, Specific (u℧) | 840 | | | | |
| 17. | Copper (ug/l) | .5 | | | | |
| 18. | Fluoride (mg/l) | 1.0 | | | | |
| 19. | Gallium (ug/l) | .003 | | | | |
| 20. | Hardness, Total | 180 | | | | |
| 21. | Hydroxide (mg/l) | < .1 | | | | |
| 22. | Iron (ug/l) | .3 | | | | |
| 23. | Lead (ug/l) | < .01 | | | | |
| 24. | Lithium (ug/l) | .3 | | | | |
| 25. | Magnesium (mg/l) | 28 | | | | |
| 26. | Manganese (ug/l) | .1 | | | | |
| 27. | Mercury (ug/l) | | | | | |
| 28. | Molybdenum (ug/l) | .02 | | | | |
| 29. | Nickel (ug/l) | .02 | | | | |
| 30. | Nitrate (mg/l) | .2 | | | | |
| 31. | pH | 7.7 | | | | |
| 32. | Phosphate, Total | <.1 | | | | |
| 33. | Potassium (mg/l) | .4 | | | | |
| 34. | Selenium (ug/l) | <.002 | | | | |
| 35. | Silica (mg/l) | 24 | | | | |
| (*)36. | Silver (ug/l) | < .002 | | | | |
| 37. | Sodium (mg/l) | 150 | | | | |
| 38. | Solids, Dissolved (mg/l) | 574 | | | | |
| 39. | Strontium (ug/l) | 2 | | | | |
| 40. | Sulfate (mg/l) | 160 | | | | |
| 41. | Titanium (ug/l) | .08 | | | | |
| 42. | Vanadium (ug/l) | .001 | | | | |
| 43. | Yttrium (mg/l) | < .002 | | | | |
| 44. | Zinc (ug/l) | .07 | | | | |
| 45. | Zirconium (ug/l) | < .002 | | | | |
| 46. | Radioactivity<br>Gross Alpha (pcl) | 1.0 | | | | |
| | Radium 226* | | | | | |
| | Gross Beta (pcl) | 0 | | | | |
| | Thorium 230** | | | | | |
| | Uranium** | | | | | |
| 47. | Total Organic Carbon (TOC)<br>If TOC >10 mgl/l then measure<br>Dissolved Organic Carbon | <1 | | | | |
| | Suspended Organic Carbon | | | | | |
| | Phenols | | | | | |
| | Sulfur, Acid Extract | | | | | |
| | Nitrogen, Base Extract | | | | | |

(*) Not required
* Required if gross alpha is greater than 4 picocuries per liter (pcl).
** Required if gross beta is greater than 100 picocuries per liter (pcl).
a. date on laboratory analysis
e - error

TABLE II B5.4

## WATER QUALITY ANALYSIS
## ENVIRONMENTAL BASELINE MONITORING

Well Number: AT-1c, String #1 1550'-1640'

| Date | | 11-17-74 | | | | |
|---|---|---|---|---|---|---|
| 1. | Aluminum (ug/1) | .9 | | | | |
| 2. | Ammonia (mg/1) | .12 | | | | |
| 3. | Arsenic (ug/1) | .03 | | | | |
| 4 | Barium (ug/1) | .04 | | | | |
| 5. | Beryllium (ug/1) | < .001 | | | | |
| 6. | Bicarbonate (mg/1) | 780 | | | | |
| 7. | Bismuth (ug/1) | < .003 | | | | |
| 8. | Boron (ug/1) | 1.1 | | | | |
| 9. | Cadmium (ug/1) | .003 | | | | |
| 10. | Calcium (mg/1) | 3.7 | | | | |
| 11. | Carbonate (mg/1) | 160 | | | | |
| 12. | Cerium (mg/1) | < .003 | | | | |
| 13. | Chloride (mg/1) | 36 | | | | |
| 14. | Chrome, Hexavalent | .003 | | | | |
| 15. | Cobalt (ug/1) | .006 | | | | |
| 16. | Conductivity, Specific (u℧) | 1420 | | | | |
| 17. | Copper (ug/1) | .1 | | | | |
| 18. | Fluoride (mg/1) | 10 | | | | |
| 19. | Gallium (ug/1) | .002 | | | | |
| 20. | Hardness, Total | 26 | | | | |
| 21. | Hydroxide (mg/1) | ≤.1 | | | | |
| 22. | Iron (ug/1) | .2 | | | | |
| 23. | Lead (ug/1) | .02 | | | | |
| 24. | Lithium (ug/1) | 5 | | | | |
| 25. | Magnesium (mg/1) | 4.1 | | | | |
| 26. | Manganese (ug/1) | .06 | | | | |
| 27. | Mercury (ug/1) | .0019 | | | | |
| 28. | Molybdenum (ug/1) | .07 | | | | |
| 29. | Nickel (ug/1) | .02 | | | | |
| 30. | Nitrate (mg/1) | < .1 | | | | |
| 31. | pH | 9.0 | | | | |
| 32. | Phosphate, Total | .1 | | | | |
| 33. | Potassium (mg/1) | – | | | | |
| 34. | Selenium (ug/1) | <.003 | | | | |
| 35. | Silica (mg/1) | 12 | | | | |
| (*)36. | Silver (ug/1) | < .003 | | | | |
| 37. | Sodium (mg/1) | 520 | | | | |
| 38. | Solids, Dissolved (mg/1) | 1224 | | | | |
| 39. | Strontium (ug/1) | .4 | | | | |
| 40. | Sulfate (mg/1) | 96 | | | | |
| 41. | Titanium (ug/1) | .08 | | | | |
| 42. | Vanadium (ug/1) | .003 | | | | |
| 43. | Yttrium (mg/1) | <.003 | | | | |
| 44. | Zinc (ug/1) | .2 | | | | |
| 45. | Zirconium (ug/1) | .004 | | | | |
| 46. | Radioactivity | | | | | |
| | Gross Alpha (pcl) | 4 | | | | |
| | Radium 226* | | | | | |
| | Gross Beta (pcl) | 41 | | | | |
| | Thorium 230** | | | | | |
| | Uranium** | | | | | |
| 47. | Total Organic Carbon (TOC) | | | | | |
| | If TOC > 10 mgl/1 then measure | | | | | |
| | Dissolved Organic Carbon | ≤1 | | | | |
| | Suspended Organic Carbon | | | | | |
| | Phenols | | | | | |
| | Sulfur, Acid Extract | | | | | |
| | Nitrogen, Base Extract | | | | | |

(*) Not required

* Required if gross alpha is greater than 4 picocuries per liter (pcl).

** Required if gross beta is greater than 100 picocuries per liter (pcl).

## TABLE II B5.5

## WATER QUALITY ANALYSIS
## ENVIRONMENTAL BASELINE MONITORING

Well Number: AT-1c, String #2, 1450' - 1480'

| Date | | 11-7-74 | | | | |
|---|---|---|---|---|---|---|
| 1. | Aluminum (ug/l) | .5 | | | | |
| 2. | Ammonia (mg/l) | .17 | | | | |
| 3. | Arsenic (ug/l) | .05 | | | | |
| 4 | Barium (ug/l) | .1 | | | | |
| 5. | Beryllium (ug/l) | .002 | | | | |
| 6. | Bicarbonate (mg/l) | 465 | | | | |
| 7. | Bismuth (ug/l) | <,008 | | | | |
| 8. | Boron (ug/l) | 1.4 | | | | |
| 9. | Cadmium (ug/l) | <.008 | | | | |
| 10. | Calcium (mg/l) | 37 | | | | |
| 11. | Carbonate (mg/l) | < .1 | | | | |
| 12. | Cerium (mg/l) | < .008 | | | | |
| 13. | Chloride (mg/l) | 3 | | | | |
| 14. | Chrome, Hexavalent | .005 | | | | |
| 15. | Cobalt (ug/l) | .003 | | | | |
| 16. | Conductivity, Specific (u℧) | 1350 | | | | |
| 17. | Copper (ug/l) | .03 | | | | |
| 18. | Fluoride (mg/l) | 8.8 | | | | |
| 19. | Gallium (ug/l) | < .008 | | | | |
| 20. | Hardness, Total | 200 | | | | |
| 21. | Hydroxide (mg/l) | < .1 | | | | |
| 22. | Iron (ug/l) | .18 | | | | |
| 23. | Lead (ug/l) | .03 | | | | |
| 24. | Lithium (ug/l) | 4 | | | | |
| 25. | Magnesium (mg/l) | 27 | | | | |
| 26. | Manganese (ug/l) | .2 | | | | |
| 27. | Mercury (ug/l) | .0009 | | | | |
| 28. | Molybdenum (ug/l) | .1 | | | | |
| 29. | Nickel (ug/l) | .006 | | | | |
| 30. | Nitrate (mg/l) | <.1 | | | | |
| 31. | pH | 7.9 | | | | |
| 32. | Phosphate, Total | <.1 | | | | |
| 33. | Potassium (mg/l) | 6.4 | | | | |
| 34. | Selenium (ug/l) | < .008 | | | | |
| 35. | Silica (mg/l) | 15 | | | | |
| (*)36. | Silver (ug/l) | < .008 | | | | |
| 37. | Sodium (mg/l) | 220 | | | | |
| 38. | Solids, Dissolved (mg/l) | 810 | | | | |
| 39. | Strontium (ug/l) | 5 | | | | |
| 40. | Sulfate (mg/l) | 230 | | | | |
| 41. | Titanium (ug/l) | .1 | | | | |
| 42. | Vanadium (ug/l) | .002 | | | | |
| 43. | Yttrium (mg/l) | <.008 | | | | |
| 44. | Zinc (ug/l) | .05 | | | | |
| 45. | Zirconium (ug/l) | < .008 | | | | |
| 46. | Radioactivity | | | | | |
| | Gross Alpha (pcl) | 1.6 | | | | |
| | Radium 226* | | | | | |
| | Gross Beta (pcl) | 0 | | | | |
| | Thorium 230** | | | | | |
| | Uranium** | | | | | |
| 47. | Total Organic Carbon (TOC)<br>If TOC >10 mgl/l then measure | < 1 | | | | |
| | Dissolved Organic Carbon | | | | | |
| | Suspended Organic Carbon | | | | | |
| | Phenols | | | | | |
| | Sulfur, Acid Extract | | | | | |
| | Nitrogen, Base Extract | | | | | |

(*) Not required

* Required if gross alpha is greater than 4 picocuries per liter (pcl).

** Required if gross beta is greater than 100 picocuries per liter (pcl).

## TABLE II B5.6

## WATER QUALITY ANALYSIS
## ENVIRONMENTAL BASELINE MONITORING

Well Number: AT-1c, String #3, 60'-1250'

| Date | | 11-7-74 | | | | |
|---|---|---|---|---|---|---|
| 1. | Aluminum (ug/l) | .9 | | | | |
| 2. | Ammonia (mg/l) | .23 | | | | |
| 3. | Arsenic (ug/l) | .06 | | | | |
| 4 | Barium (ug/l) | .02 | | | | |
| 5. | Beryllium (ug/l) | .002 | | | | |
| 6. | Bicarbonate (mg/l) | 452 | | | | |
| 7. | Bismuth (ug/l) | .002 | | | | |
| 8. | Boron (ug/l) | 1.3 | | | | |
| 9. | Cadmium (ug/l) | < .002 | | | | |
| 10. | Calcium (mg/l) | 15 | | | | |
| 11. | Carbonate (mg/l) | 9 | | | | |
| 12. | Cerium (mg/l) | < .002 | | | | |
| 13. | Chloride (mg/l) | 7 | | | | |
| 14. | Chrome, Hexavalent | .006 | | | | |
| 15. | Cobalt (ug/l) | .002 | | | | |
| 16. | Conductivity, Specific (uʊ) | 1200 | | | | |
| 17. | Copper (ug/l) | .03 | | | | |
| 18. | Fluoride (mg/l) | 6.4 | | | | |
| 19. | Gallium (ug/l) | <.002 | | | | |
| 20. | Hardness, Total | 150 | | | | |
| 21. | Hydroxide (mg/l) | .1 | | | | |
| 22. | Iron (ug/l) | .28 | | | | |
| 23. | Lead (ug/l) | .01 | | | | |
| 24. | Lithium (ug/l) | .5 | | | | |
| 25. | Magnesium (mg/l) | 23 | | | | |
| 26. | Manganese (ug/l) | .2 | | | | |
| 27. | Mercury (ug/l) | .008 | | | | |
| 28. | Molybdenum (ug/l) | .02 | | | | |
| 29. | Nickel (ug/l) | .01 | | | | |
| 30. | Nitrate (mg/l) | <.1 | | | | |
| 31. | pH | 8.6 | | | | |
| 32. | Phosphate, Total | <.1 | | | | |
| 33. | Potassium (mg/l) | 3.6 | | | | |
| 34. | Selenium (ug/l) | <.002 | | | | |
| 35. | Silica (mg/l) | 18 | | | | |
| (*)36. | Silver (ug/l) | <.002 | | | | |
| 37. | Sodium (mg/l) | 221 | | | | |
| 38. | Solids, Dissolved (mg/l) | 750 | | | | |
| 39. | Strontium (ug/l) | 2 | | | | |
| 40. | Sulfate (mg/l) | 226 | | | | |
| 41. | Titanium (ug/l) | .08 | | | | |
| 42. | Vanadium (ug/l) | <.001 | | | | |
| 43. | Yttrium (mg/l) | <.002 | | | | |
| 44. | Zinc (ug/l) | .03 | | | | |
| 45. | Zirconium (ug/l) | <.002 | | | | |
| 46. | Radioactivity | | | | | |
| | Gross Alpha (pcl) | 2 | | | | |
| | Radium 226* | | | | | |
| | Gross Beta (pcl) | 2 | | | | |
| | Thorium 230** | | | | | |
| | Uranium** | | | | | |
| 47. | Total Organic Carbon (TOC) | | | | | |
| | If TOC >10 mgl/l then measure | | | | | |
| | Dissolved Organic Carbon | < 1 | | | | |
| | Suspended Organic Carbon | | | | | |
| | Phenols | | | | | |
| | Sulfur, Acid Extract | | | | | |
| | Nitrogen, Base Extract | | | | | |

(*) Not required

* Required if gross alpha is greater than 4 picocuries per liter (pcl).

** Required if gross beta is greater than 100 picocuries per liter (pcl).

## TABLE II B5.7

## WATER QUALITY ANALYSIS
## ENVIRONMENTAL BASELINE MONITORING

Well Number: SG-9, String #1

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. | Aluminum (ug/l) | .4 | | | | |
| 2. | Ammonia (mg/l) | .1 | | | | |
| 3. | Arsenic (ug/l) | .02 | | | | |
| 4 | Barium (ug/l) | .08 | | | | |
| 5. | Beryllium (ug/l) | .001 | | | | |
| 6. | Bicarbonate (mg/l) | 860 | | | | |
| 7. | Bismuth (ug/l) | < .002 | | | | |
| 8. | Boron (ug/l) | 4.9 | | | | |
| 9. | Cadmium (ug/l) | .1 | | | | |
| 10. | Calcium (mg/l) | 19 | | | | |
| 11. | Carbonate (mg/l) | 72 | | | | |
| 12. | Cerium (mg/l) | .002 | | | | |
| 13. | Chloride (mg/l) | 44 | | | | |
| 14. | Chrome, Hexavalent | .006 | | | | |
| 15. | Cobalt (ug/l) | .002 | | | | |
| 16. | Conductivity, Specific (u℧) | 1500 | | | | |
| 17. | Copper (ug/l) | .03 | | | | |
| 18. | Fluoride (mg/l) | 18 | | | | |
| 19. | Gallium (ug/l) | .003 | | | | |
| 20. | Hardness, Total | 78. | | | | |
| 21. | Hydroxide (mg/l) | < .1 | | | | |
| 22. | Iron (ug/l) | .68 | | | | |
| 23. | Lead (ug/l) | .01 | | | | |
| 24. | Lithium (ug/l) | .22 | | | | |
| 25. | Magnesium (mg/l) | 7.5 | | | | |
| 26. | Manganese (ug/l) | .09 | | | | |
| 27. | Mercury (ug/l) | - | | | | |
| 28. | Molybdenum (ug/l) | .07 | | | | |
| 29. | Nickel (ug/l) | .003 | | | | |
| 30. | Nitrate (mg/l) | < .1 | | | | |
| 31. | pH | 8.6 | | | | |
| 32. | Phosphate, Total | < .1 | | | | |
| 33. | Potassium (mg/l) | 5.3 | | | | |
| 34. | Selenium (ug/l) | .005 | | | | |
| 35. | Silica (mg/l) | 15 | | | | |
| (*)36. | Silver (ug/l) | .009 | | | | |
| 37. | Sodium (mg/l) | 400 | | | | |
| 38. | Solids, Dissolved (mg/l) | 1050 | | | | |
| 39. | Strontium (ug/l) | 2 | | | | |
| 40. | Sulfate (mg/l) | 51 | | | | |
| 41. | Titanium (ug/l) | .1 | | | | |
| 42. | Vanadium (ug/l) | .002 | | | | |
| 43. | Yttrium (mg/l) | < .002 | | | | |
| 44. | Zinc (ug/l) | 1 | | | | |
| 45. | Zirconium (ug/l) | < .002 | | | | |
| 46. | Radioactivity | | | | | |
| | Gross Alpha (pcl) | 4.5 | | | | |
| | Radium 226* | 0 | | | | |
| | Gross Beta (pcl) | 0 | | | | |
| | Thorium 230** | | | | | |
| | Uranium** | | | | | |
| 47. | Total Organic Carbon (TOC)<br>If TOC > 10 mgl/1 then measure | | | | | |
| | Dissolved Organic Carbon | < 1 | | | | |
| | Suspended Organic Carbon | | | | | |
| | Phenols | | | | | |
| | Sulfur, Acid Extract | | | | | |
| | Nitrogen, Base Extract | | | | | |

(*) Not required

* Required if gross alpha is greater than 4 picocuries per liter (pcl).

** Required if gross beta is greater than 100 picocuries per liter (pcl).

TABLE II B5.8

## WATER QUALITY ANALYSIS
## ENVIRONMENTAL BASELINE MONITORING

Well Number: SG-9, String #2.

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. | Aluminum (ug/l) | .7 | | | | |
| 2. | Ammonia (mg/l) | .2 | | | | |
| 3. | Arsenic (ug/l) | .009 | | | | |
| 4 | Barium (ug/l) | .07 | | | | |
| 5. | Beryllium (ug/l) | .003 | | | | |
| 6. | Bicarbonate (mg/l) | 690 | | | | |
| 7. | Bismuth (ug/l) | .004 | | | | |
| 8. | Boron (ug/l) | 1.5 | | | | |
| 9. | Cadmium (ug/l) | <.004 | | | | |
| 10. | Calcium (mg/l) | 117 | | | | |
| 11. | Carbonate (mg/l) | 42 | | | | |
| 12. | Cerium (mg/l) | <.004 | | | | |
| 13. | Chloride (mg/l) | 60 | | | | |
| 14. | Chrome, Hexavalent | .01 | | | | |
| 15. | Cobalt (ug/l) | .01 | | | | |
| 16. | Conductivity, Specific (uʊ) | 1640 | | | | |
| 17. | Copper (ug/l) | .03 | | | | |
| 18. | Fluoride (mg/l) | .2 | | | | |
| 19. | Gallium (ug/l) | .004 | | | | |
| 20. | Hardness, Total | 570 | | | | |
| 21. | Hydroxide (mg/l) | <.1 | | | | |
| 22. | Iron (ug/l) | .18 | | | | |
| 23. | Lead (ug/l) | <.02 | | | | |
| 24. | Lithium (ug/l) | .27 | | | | |
| 25. | Magnesium (mg/l) | 68 | | | | |
| 26. | Manganese (ug/l) | .4 | | | | |
| 27. | Mercury (ug/l) | – | | | | |
| 28. | Molybdenum (ug/l) | .08 | | | | |
| 29. | Nickel (ug/l) | .02 | | | | |
| 30. | Nitrate (mg/l) | .4 | | | | |
| 31. | pH | 8.8 | | | | |
| 32. | Phosphate, Total | <.1 | | | | |
| 33. | Potassium (mg/l) | 4.8 | | | | |
| 34. | Selenium (ug/l) | .009 | | | | |
| 35. | Silica (mg/l) | 22 | | | | |
| (*)36. | Silver (ug/l) | .004 | | | | |
| 37. | Sodium (mg/l) | 310 | | | | |
| 38. | Solids, Dissolved (mg/l) | 1332 | | | | |
| 39. | Strontium (ug/l) | 3 | | | | |
| 40. | Sulfate (mg/l) | 375 | | | | |
| 41. | Titanium (ug/l) | .05 | | | | |
| 42. | Vanadium (ug/l) | .004 | | | | |
| 43. | Yttrium (mg/l) | <.004 | | | | |
| 44. | Zinc (ug/l) | .1 | | | | |
| 45. | Zirconium (ug/l) | <.004 | | | | |
| 46. | Radioactivity<br>Gross Alpha (pcl) | 1.7 | | | | |
| | Radium 226* | | | | | |
| | Gross Beta (pcl) | 15 | | | | |
| | Thorium 230** | | | | | |
| | Uranium** | | | | | |
| 47. | Total Organic Carbon (TOC)<br>If TOC > 10 mgl/l then measure<br>Dissolved Organic Carbon | 8 | | | | |
| | Suspended Organic Carbon | | | | | |
| | Phenols | | | | | |
| | Sulfur, Acid Extract | | | | | |
| | Nitrogen, Base Extract | | | | | |

(*) Not required

* Required if gross alpha is greater than 4 picocuries per liter (pcl).

** Required if gross beta is greater than 100 picocuries per liter (pcl).

TABLE II B5.9

## WATER QUALITY ANALYSIS
## ENVIRONMENTAL BASELINE MONITORING

Well Number: SG-11, String No. 1, Lower Aquifer

| Date | | 11/2/74 | | | | |
|---|---|---|---|---|---|---|
| 1. | Aluminum (ug/l) | 0.4 | | | | |
| 2. | Ammonia (mg/l) | - | | | | |
| 3. | Arsenic (ug/l) | .03 | | | | |
| 4 | Barium (ug/l) | 5 | | | | |
| 5. | Beryllium (ug/l) | .002 | | | | |
| 6. | Bicarbonate (mg/l) | 21,594 | | | | |
| 7. | Bismuth (ug/l) | <.006 | | | | |
| 8. | Boron (ug/l) | 315 | | | | |
| 9. | Cadmium (ug/l) | <.006 | | | | |
| 10. | Calcium (mg/l) | 6 | | | | |
| 11. | Carbonate (mg/l) | 1962 | | | | |
| 12. | Cerium (mg/l) | <.006 | | | | |
| 13. | Chloride (mg/l) | 8154 | | | | |
| 14. | Chrome, Hexavalent | .007 | | | | |
| 15. | Cobalt (ug/l) | .03 | | | | |
| 16. | Conductivity, Specific (u℧) | 40,000 | | | | |
| 17. | Copper (ug/l) | 0.2 | | | | |
| 18. | Fluoride (mg/l) | 48 | | | | |
| 19. | Gallium (ug/l) | .02 | | | | |
| 20. | Hardness, Total | 48 | | | | |
| 21. | Hydroxide (mg/l) | <.1 | | | | |
| 22. | Iron (ug/l) | 3 | | | | |
| 23. | Lead (ug/l) | .03 | | | | |
| 24. | Lithium (ug/l) | 79 | | | | |
| 25. | Magnesium (mg/l) | 14 | | | | |
| 26. | Manganese (ug/l) | .07 | | | | |
| 27. | Mercury (ug/l) | .0026 | | | | |
| 28. | Molybdenum (ug/l) | .01 | | | | |
| 29. | Nickel (ug/l) | - | | | | |
| 30. | Nitrate (mg/l) | .1 | | | | |
| 31. | pH | 8.8 | | | | |
| 32. | Phosphate, Total | .1 | | | | |
| 33. | Potassium (mg/l) | 125 | | | | |
| 34. | Selenium (ug/l) | <.006 | | | | |
| 35. | Silica (mg/l) | 24 | | | | |
| (*)36. | Silver (ug/l) | <.006 | | | | |
| 37. | Sodium (mg/l) | 16,367 | | | | |
| 38. | Solids, Dissolved (mg/l) | 38,592 | | | | |
| 39. | Strontium (ug/l) | 3 | | | | |
| 40. | Sulfate (mg/l) | 2 | | | | |
| 41. | Titanium (ug/l) | .2 | | | | |
| 42. | Vanadium (ug/l) | .02 | | | | |
| 43. | Yttrium (mg/l) | .03 | | | | |
| 44. | Zinc (ug/l) | .03 | | | | |
| 45. | Zirconium (ug/l) | .9 | | | | |
| 46. | Radioactivity | | | | | |
| | Gross Alpha (pcl) | 43 | | | | |
| | Radium 226* | 27 | | | | |
| | Gross Beta (pcl) | 390 | | | | |
| | Thorium 230** | 0 | | | | |
| | Uranium** | 0 | | | | |
| 47. | Total Organic Carbon (TOC) | | | | | |
| | If TOC > 10 mgl/l then measure | 29 | | | | |
| | Dissolved Organic Carbon | | | | | |
| | Suspended Organic Carbon | 11 | | | | |
| | Phenols | 5 | | | | |
| | Sulfur, Acid Extract | | | | | |
| | Nitrogen, Base Extract | | | | | |

(*) Not required

* Required if gross alpha is greater than 4 picocuries per liter (pcl).

** Required if gross beta is greater than 100 picocuries per liter (pcl).

TABLE II B5.10

## WATER QUALITY ANALYSIS
## ENVIRONMENTAL BASELINE MONITORING

Well Number: SG-19

| | Date | 11/1/74 | | | | |
|---|---|---|---|---|---|---|
| 1. | Aluminum (ug/l) | .3 | | | | |
| 2. | Ammonia (mg/l) | .14 | | | | |
| 3. | Arsenic (ug/l) | <.001 | | | | |
| 4 | Barium (ug/l) | .2 | | | | |
| 5. | Beryllium (ug/l) | <.002 | | | | |
| 6. | Bicarbonate (mg/l) | 1780 | | | | |
| 7. | Bismuth (ug/l) | <.002 | | | | |
| 8. | Boron (ug/l) | 2.0 | | | | |
| 9. | Cadmium (ug/l) | <.002 | | | | |
| 10. | Calcium (mg/l) | 6.6 | | | | |
| 11. | Carbonate (mg/l) | 66 | | | | |
| 12. | Cerium (mg/l) | <.002 | | | | |
| 13. | Chloride (mg/l) | 10 | | | | |
| 14. | Chrome, Hexavalent | .002 | | | | |
| 15. | Cobalt (ug/l) | <.001 | | | | |
| 16. | Conductivity, Specific (u℧) | 2750 | | | | |
| 17. | Copper (ug/l) | .08 | | | | |
| 18. | Fluoride (mg/l) | 3.1 | | | | |
| 19. | Gallium (ug/l) | .002 | | | | |
| 20. | Hardness, Total | 29 | | | | |
| 21. | Hydroxide (mg/l) | <.1 | | | | |
| 22. | Iron (ug/l) | .05 | | | | |
| 23. | Lead (ug/l) | <.008 | | | | |
| 24. | Lithium (ug/l) | .8 | | | | |
| 25. | Magnesium (mg/l) | 2.9 | | | | |
| 26. | Manganese (ug/l) | .002 | | | | |
| 27. | Mercury (ug/l) | .0019 | | | | |
| 28. | Molybdenum (ug/l) | .003 | | | | |
| 29. | Nickel (ug/l) | .002 | | | | |
| 30. | Nitrate (mg/l) | <.1 | | | | |
| 31. | pH | 8.4 | | | | |
| 32. | Phosphate, Total | <.1 | | | | |
| 33. | Potassium (mg/l) | - | | | | |
| 34. | Selenium (ug/l) | <.002 | | | | |
| 35. | Silica (mg/l) | 9 | | | | |
| (*)36. | Silver (ug/l) | <.002 | | | | |
| 37. | Sodium (mg/l) | 755 | | | | |
| 38. | Solids, Dissolved (mg/l) | 1810 | | | | |
| 39. | Strontium (ug/l) | .4 | | | | |
| 40. | Sulfate (mg/l) | <4 | | | | |
| 41. | Titanium (ug/l) | .03 | | | | |
| 42. | Vanadium (ug/l) | <.001 | | | | |
| 43. | Yttrium (mg/l) | <.002 | | | | |
| 44. | Zinc (ug/l) | .05 | | | | |
| 45. | Zirconium (ug/l) | .002 | | | | |
| 46. | Radioactivity | | | | | |
| | Gross Alpha (pcl) | 7.9 | | | | |
| | Radium 226* | 0.1 | | | | |
| | Gross Beta (pcl) | 33 | | | | |
| | Thorium 230** | | | | | |
| | Uranium** | | | | | |
| 47. | Total Organic Carbon (TOC)<br>If TOC >10 mgl/l then measure | | | | | |
| | Dissolved Organic Carbon | <1 | | | | |
| | Suspended Organic Carbon | | | | | |
| | Phenols | | | | | |
| | Sulfur, Acid Extract | | | | | |
| | Nitrogen, Base Extract | | | | | |

(*) Not required

* Required if gross alpha is greater than 4 picocuries per liter (pcl).

** Required if gross beta is greater than 100 picocuries per liter (pcl).

THE OIL SHALE CORPORATION
INTER OFFICE MEMORANDUM

NEW YORK ☐
DENVER ☒
LOS ANGELES ☐

LABORATORY DATA LETTER 75-26

| | | | |
|---|---|---|---|
| FROM: | F. C. Haas | DATE: | February 12, 1975 |
| | | FILE NO.: | 5100-3 |
| TO: | File | SUBJECT: | Analyses of Environmental Water Samples from Core Hole Nos. C-b-1, C-b-2 and C-b-4 |

Project No. 197

Three water samples were taken from core hole Nos. C-b-1, C-b-2 and C-b-4. Samples were taken on 11-16-74 (C-b-2), 11-17-74 (C-b-4) and 11-18-74 (C-b-1). These samples were analyzed for major and minor constituents, trace metals, radioactivity and total organic carbon. Major constituent analyses were done by Industrial Laboratories, Denver, Colorado, and TOSCO, Rocky Flats. Minor constituent analyses were done by Industrial Laboratories. Trace metals and total organic carbon were done by Commercial Testing & Engineering, Golden, Colorado. Radioactivity was done by Hazen Research, Inc. Results of the analyses are attached.

Industrial Laboratories pH results are about 0.5 pH units lower than TOSCOs'. This then reflects in the carbonate values; the lower the pH measures, the lower the carbonate. This is probably not too important, as the true pH value is the pH taken at the sample site (pH changes with time).

Total organic carbon in all samples was less than 10 mg/liter.

The sample from C-b-1 contained greater than 4 pCi/l of gross alpha radiation; $Ra_{226}$ was then determined, but was found to be less than 4 pCi/l.

FCH/aw
Encs.

Approved (MTA)

cc: Messrs. Vawter, Spence, Schulman, Cleveland, Schillinger, Legatski (ARCO), Matis (ARCO) and Tait (ARCO)

Table 1

## ENVIRONMENTAL SAMPLES FROM CORE HOLES C-b-1, C-b-2 AND C-b-4 (MAJOR CONSTITUENT ANALYSES)

| Component | C-b-1 |  | C-b-2 |  | C-b-4 |  |
|---|---|---|---|---|---|---|
|  | Industrial | TOSCO | Industrial | TOSCO | Industrial | TOSCO |
| Sodium, mg/l | 980 | 1090 | 350 | 381 | 150 | 127 |
| Potassium, mg/l | NA | 9.0 | NA | 3.0 | NA | 0.4 |
| Calcium, mg/l | 9.4 | 4.2 | 8.2 | 6.0 | 30 | 22 |
| Magnesium, mg/l | 8.2 | 3.8 | 4.5 | 3.8 | 28 | 23 |
| Sulfate, mg/l | <4 | ND | 360 | 333 | 160 | 140 |
| Carbonate, mg/l | <0.1 | 62.4 | 3.6 | 24 | <0.1 | 5 |
| Bicarbonate, mg/l | 2570 | 2541 | 450 | 499 | 360 | 351 |
| Chloride, mg/l | 82 | 64 | 9.6 | 10 | 6.9 | 2.3 |
| Fluoride, mg/l | 16 | 26 | 2.9 | 1 | 1.0 | 0.3 |
| $\Sigma$ Cations, meq/l | 43.77 | 48.20 | 16.00 | 17.25 | 10.33 | 8.54 |
| $\Sigma$ Anions, meq/l | 45.28 | 46.92 | 15.02 | 16.26 | 9.42 | 8.93 |
| % Difference | 1.7 | 1.1 | 3.3 | 3.0 | 4.6 | 2.2 |
| Silica, mg/l | 11 | 12 | 17 | 17 | 24 | 23 |
| pH | 8.2 | 8.7 | 8.4 | 8.9 | 7.7 | 8.4 |
| Conductivity, μmhos/cm | 3800 | 3900 | 1600 | 1600 | 840 | 850 |
| Calculated TDS, mg/l | 2366 | 2514 | 976 | 1024 | 574 | 515 |

NA - Not Analyzed.
ND - Not Detected.

THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211

TELEPHONE 455-3641

ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY
John Matis

DATE RECEIVED: 11/26/74
DATE REPORTED: 12/9/74

LAB. NUMBER: 5002

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

SAMPLE MARKED: Cb1 - 11/18

ANALYSIS:

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 9.4 | 0.469 |
| Magnesium | 8.2 | 0.675 |
| Sodium | 980 | 42.630 |
| Carbonate | Less than 0.1 | --- |
| Bicarbonate | 2,570 | 42.122 |
| Chloride | 82 | 2.313 |
| Sulfate | Less than 4 | --- |
| Nitrate | 0.5 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 11 | 0.366 |
| Iron | Less than 0.05 | --- |
| Fluoride | 16 | 0.842 |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 35 | |
| Total dissolved solids (calculated) | 2,400 | |
| Ammonia-nitrogen | 2.1 | |
| Lithium | Less than 0.5 | |
| Barium | Less than 1.0 | |
| Hexavalent chromium | Less than 0.01 | |
| Arsenic | Less than 0.01 | |
| Selenium | Less than 0.01 | |
| Boron | 0.7 | |
| Hydroxide | Less than 0.1 | |

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | Less than 0.1 |
| Copper | Less than 0.1 |
| Cadmium | Less than 0.01 |
| Lead | Less than 0.05 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.05 |
| Zinc | Less than 0.5 |

pH 8.2
Specific conductance 3,800 micromhos per

THE INDUSTRIAL LABORATORIES COMPANY

H. Paul Ochs

CHEMIST

MEMBERS OF:

AMERICAN ASS'N OF CEREAL CHEMISTS
AMERICAN CHEMICAL SOCIETY
AMERICAN OIL CHEMISTS' SOCIETY
ASS'N OF OFFICIAL RACING CHEMISTS
BAKERY ENGINEERS OF AMERICA
INSTITUTE OF FOOD TECHNOLOGY
SIGMA XI

IN WHOLE OR IN PART, FOR ADVERTISING PURPOSES WITHOUT OBTAINING PRIOR WRITTEN AUTHORIZATIO

# THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211
TELEPHONE 455-3641

ANALYSIS REPORT

| | |
|---|---|
| DATE RECEIVED: | 11/26/74 |
| DATE REPORTED: | 12/9/74 |
| LAB. NUMBER: | 5003 |

ATLANTIC RICHFIELD COMPANY
John Matis

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE

SAMPLE MARKED: CB2 11/16

ANALYSIS:

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 8.2 | 0.409 |
| Magnesium | 4.5 | 0.370 |
| Sodium | 350 | 15.225 |
| Carbonate | 3.6 | --- |
| Bicarbonate | 450 | 7.375 |
| Chloride | 9.6 | --- |
| Sulfate | 360 | 7.495 |
| Nitrate | 0.3 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 17 | 0.516 |

| | |
|---|---|
| Iron | 0.33 |
| Fluoride | 2.9 |
| P. alkalinity, in terms of calcium carbonate | --- |
| MO alkalinity, in terms of calcium carbonate | --- |
| Hardness, in terms of calcium carbonate | 39 |
| Total dissolved solids (calculated) | 980 |
| Ammonia-nitrogen | 0.5 |
| Lithium | Less than 0.5 |
| Barium | Less than 1 |
| Hexavalent chromium | Less than 0.01 |
| Arsenic | Less than 0.01 |
| Selenium | Less than 0.01 |
| Boron | 2.9 |
| Hydroxide | Less than 0.1 |
| RXUMXRUMX | XXXX |

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | 0.15 |
| Copper | Less than 0.1 |
| Cadmium | Less than 0.01 |
| Lead | Less than 0.05 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.05 |
| Zinc | Less than 0.5 |

pH 8.4
Specific conductance
1,600 micromhos per cc

THE INDUSTRIAL LABORATORIES COMPANY

CHEMIST

MEMBERS OF:

AMERICAN ASS'N OF CEREAL CHEMISTS
AMERICAN CHEMICAL SOCIETY
AMERICAN OIL CHEMISTS' SOCIETY
ASS'N OF OFFICIAL RACING CHEMISTS
BAKERY ENGINEERS OF AMERICA
INSTITUTE OF FOOD TECHNOLOGY
SIGMA XI

[illegible] IN PART. FOR ADVERTISING PURPOSES WITHOUT OBTAINING PRIOR WRITTEN AUTHORIZATIO

**THE INDUSTRIAL LABORATORIES COMPANY**

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211
TELEPHONE 455-3641

**ANALYSIS REPORT**

ATLANTIC RICHFIELD COMPANY
John Matis

| | |
|---|---|
| **DATE RECEIVED:** | 11/26/74 |
| **DATE REPORTED:** | 12/9/74 |
| **LAB. NUMBER:** | 5004 |

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

SAMPLE MARKED: Cb4 11/17

ANALYSIS:

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 30 | 1.497 |
| Magnesium | 28 | 2.304 |
| Sodium | 150 | 6.525 |
| Carbonate | Less than 0.1 | --- |
| Bicarbonate | 360 | 5.900 |
| Chloride | 6.9 | --- |
| Sulfate | 160 | 3.331 |
| Nitrate | 0.2 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 24 | 0.799 |
| Iron | 0.23 | |
| Fluoride | 1.0 | |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 180 | |
| Total dissolved solids (calculated) | 585 | |
| Ammonia-nitrogen | 0.4 | |
| Lithium | Less than 0.5 | |
| Barium | Less than 1 | |
| Hexavalent chromium | Less than 0.01 | |
| Arsenic | Less than 0.01 | |
| Selenium | Less than 0.01 | |
| Boron | 2.8 | |
| Hydroxide | Less than 0.1 | |

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | Less than 0.1 |
| Copper | Less than 0.1 |
| Cadmium | Less than 0.01 |
| Lead | Less than 0.05 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.05 |
| Zinc | Less than 0.5 |

pH 7.7
Specific conductance
840 micromhos per cc

THE INDUSTRIAL LABORATORIES COMPANY
H. Paul Ocha
CHEMIST

EMBERS OF:

AMERICAN ASS'N OF CEREAL CHEMISTS
AMERICAN CHEMICAL SOCIETY
AMERICAN OIL CHEMISTS' SOCIETY
ASS'N OF OFFICIAL RACING CHEMISTS
BAKERY ENGINEERS OF AMERICA
INSTITUTE OF FOOD TECHNOLOGY
SIGMA XI

REPORT IS NOT TO BE REPRODUCED, IN WHOLE OR IN PART, FOR ADVERTISING PURPOSES WITHOUT OBTAINING PRIOR WRITTEN AUTHORIZATION

RECEIVED
JAN 3 1975
TOSCO/GOLDEN

HAZEN RESEARCH, INC.
4601 Indiana Street
Golden, Colorado 80401

Mr. Frank C. Haas
The Oil Shale Corporation
18200 West Highway 72
Golden, Colorado 80401

Date: January 2, 1975
HRI Project No. 535
HRI Series No. 7655
Samples received: Nov. 27, 1974

## REPORT OF ANALYSIS

| Analysis No. | Sample Designation | | pCi/l | | | pCi/l | | | pCi/l | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | α Total | ± | α Precision* | β Total | ± | β Precision* | $Ra^{226}$ | ± | Precision* |
| 7655-1 | Arco et al SG#10-1105 Base Mine Zone | 9.7 | ± | 2.6 | 0 | ± | 8 | 0.3 | ± | 0.4 |
| -2 ✓ | Environmental Cb-1 11/18 | 4.3 | ± | 5.5 | 0 | ± | 25 | 0.1 | ± | 0.4 |
| -3 | Arco et al SG#8 Bottom of Mining zone @ 1013 | 3.4 | ± | 2.6 | 0 | ± | 11 | | | |
| -4 | Arco SG#1 Above Base "A" Grove @ 970 | 0 | ± | 1.6 | 0 | ± | 7 | | | |
| -5 ✓ | Environmental Cb-2 11/16 | 1.8 | ± | 2.3 | 0 | ± | 9 | | | |
| -6 | Top of Parachute @ 706 | 0.4 | ± | 1.6 | 0 | ± | 8 | | | |
| -7 | Arco et al SG#17, #7 DST 1015-1062 | 4.5 | ± | 2.0 | 0 | ± | 8 | 0.3 | ± | 0.5 |
| -8 | SG#1-613 | 11 | ± | 3 | 0 | ± | 8 | 0 | ± | 0.4 |
| -9 | Arco et al SG#17 DST Depth 808 11/9 | 1.3 | ± | 1.5 | 0 | ± | 8 | | | |
| -10 ✓ | Environmental Cb-4 11/17 | 1.0 | ± | 1.5 | 0 | ± | 8 | | | |
| -11 | Arco et al SG#8 Depth 971 Top of Mining Zone 11/4 | 0.8 | ± | 2.5 | 0 | ± | 11 | | | |
| -12 | Arco SG#8 600 ft. 1600 ml 10/26 | 2.6 | ± | 2.0 | 0 | ± | 8 | | | |

*Variability of the radioactive disintegration process (counting error) at the 95% confidence level, 1.96σ

By: John C. Jarvis
John C. Jarvis
Manager, Analytical Laboratory

ljb

**COMMERCIAL TESTING & ENGINEERING CO.**

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, CO 80401

Date: 9 January 75

Analyst: S. Sweeney

P. O. No.:

Sample No.: Environmental $Cb_1$ 11/18/74

IAD No.: 97-183-002-12

CONCENTRATION IN µg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | 0.002 |
| Thorium | | Gadolinium | | Molybdenum | 0.02 | Titanium | 0.05 |
| Bismuth | | Europium | | Niobium | | Scandium | <0.001 |
| Lead | ≤0.008 | Samarium | | Zirconium | | Calcium | * |
| Thallium | | Neodymium | | Yttrium | | Potassium | * |
| Mercury | NR | Praseodymium | | Strontium | 0.4 | Chlorine | * |
| Gold | | Cerium | | Rubidium | 0.01 | Sulfur | * |
| Platinum | | Lanthanum | | Bromine | 0.03 | Phosphorus | 0.09 |
| Iridium | | Barium | 0.08 | Selenium | | Silicon | * |
| Osmium | | Cesium | 0.002 | Arsenic | 0.002 | Aluminum | 0.05 |
| Rhenium | | Iodine | 0.002 | Germanium | | Magnesium | * |
| Tungsten | | Tellurium | | Gallium | | Sodium | * |
| Tantalum | | Antimony | | Zinc | 0.04 | Fluorine | * |
| Hafnium | | Tin | | Copper | 0.09 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 0.009 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | 0.01 | Carbon | NR |
| Thulium | | Silver | | Iron | 0.3 | Boron | 0.4 |
| Erbium | | Palladium | | Manganese | 0.2 | Beryllium | |
| Holmium | | Rhodium | | Chromium | 0.006 | Lithium | 0.3 |
| Dysprosium | | | | | | Hydrogen | NR |

NR — Not Reported
All elements not reported <0.002 µg/ml II B-164 Approved:
*Not reported upon request

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, CO 80401

Date: 9 January 75

Analyst: S. Sweeney

P. O. No.:

Sample No.: Environmental $Cb_2$ 11/16/74

IAD No.: 97-183-002-12

CONCENTRATION IN µg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | 0.002 |
| Thorium | | Gadolinium | | Molybdenum | 0.04 | Titanium | 0.07 |
| Bismuth | 0.005 | Europium | | Niobium | | Scandium | <0.001 |
| Lead | 0.02 | Samarium | | Zirconium | | Calcium | * |
| Thallium | | Neodymium | | Yttrium | | Potassium | * |
| Mercury | NR | Praseodymium | | Strontium | 0.7 | Chlorine | * |
| Gold | | Cerium | | Rubidium | 0.02 | Sulfur | * |
| Platinum | | Lanthanum | | Bromine | 0.03 | Phosphorus | 0.4 |
| Iridium | | Barium | 0.04 | Selenium | | Silicon | * |
| Osmium | | Cesium | | Arsenic | 0.02 | Aluminum | MC |
| Rhenium | | Iodine | | Germanium | | Magnesium | * |
| Tungsten | | Tellurium | | Gallium | 0.003 | Sodium | * |
| Tantalum | | Antimony | | Zinc | 0.4 | Fluorine | * |
| Hafnium | | Tin | | Copper | 3 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 0.02 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | 0.002 | Carbon | NR |
| Thulium | | Silver | | Iron | 0.5 | Boron | 0.02 |
| Erbium | | Palladium | | Manganese | 0.1 | Beryllium | <0.001 |
| Holmium | | Rhodium | | Chromium | 0.03 | Lithium | 3 |
| Dysprosium | | | | | | Hydrogen | NR |

NR — Not Reported
All elements not reported <0.002 µg/ml
MC - Major component - element greater than 10 µg/ml
*Not reported upon request

Approved:

**COMMERCIAL TESTING & ENGINEERING CO.**
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, CO 80401

Date: 9 January 75

Analyst: S. Sweeney

P. O. No.:

Sample No.: Environmental $Cb_4$ 11/17/74

IAD No.: 97-183-002-12

CONCENTRATION IN μg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | 0.001 |
| Thorium | | Gadolinium | | Molybdenum | 0.02 | Titanium | 0.08 |
| Bismuth | | Europium | | Niobium | | Scandium | 0.002 |
| Lead | ≤0.01 | Samarium | | Zirconium | | Calcium | * |
| Thallium | | Neodymium | | Yttrium | | Potassium | * |
| Mercury | NR | Praseodymium | | Strontium | 2 | Chlorine | * |
| Gold | | Cerium | | Rubidium | 0.006 | Sulfur | * |
| Platinum | | Lanthanum | | Bromine | 0.03 | Phosphorus | 1 |
| Iridium | | Barium | 0.02 | Selenium | | Silicon | * |
| Osmium | | Cesium | | Arsenic | 0.01 | Aluminum | MC |
| Rhenium | | Iodine | 0.004 | Germanium | | Magnesium | * |
| Tungsten | | Tellurium | | Gallium | 0.003 | Sodium | * |
| Tantalum | | Antimony | | Zinc | 0.07 | Fluorine | * |
| Hafnium | | Tin | | Copper | 0.5 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 0.02 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | 0.002 | Carbon | NR |
| Thulium | | Silver | | Iron | 0.3 | Boron | 0.03 |
| Erbium | | Palladium | | Manganese | 0.1 | Beryllium | <0.001 |
| Holmium | | Rhodium | | Chromium | 0.03 | Lithium | 0.3 |
| Dysprosium | | | | | | Hydrogen | NR |

NR -- Not Reported
All elements not reported <0.002 μg/ml
MC - Major component - element greater than 10 μg/ml
*Not reported upon request

Approved:

CABLE ADDRESS COMTECO

**COMMERCIAL TESTING & ENGINEERING CO.**

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434

SINCE 1908

Reply to
Instrumental Analysis Division
14335 West 44th Avenue
Golden, Colorado 80401

Phone: 303-278-9521

9 January 75

Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, CO  80401

RE: IAD #97-183-002-12

Analytical Report

| | TOC* mg/liter |
|---|---|
| ✓ Environmental Cb-4 (11-17-74) | -1 |
| ✓ Environmental Cb-2 (11-16-74) | -1 |
| ✓ Environmental Cb-1 (11-18-74) | 1 |
| ARCO SG #1 above Base "A" grove @ 970' | -1 |
| ARCO et al SG #1 @ 1105' Base mine Zone | -1 |
| ARCO et al SG #17 #7 Dst. 1017'-1062' | -1 |
| ARCO et al SG #8 Btm of mining zone @ 1013' | -1 |
| Top of parachute cr @ 706 | -1 |
| ARCO et al SG #8 971-Top of mining zone (11-4-74) | -1 |
| SG #1 @ 613' | -1 |
| ARCO SG #8 600' 1600 mΩ 10-26-74 | -1 |
| ARCO et al #17 Dst Depth 808' (11-9-74) | 6 |

*Test performed on water make "Regular".
Minus sign indicates less than reported value.

M L Jacobs
M. L. Jacobs, Ph.D.
Divisional Manager

MLJ/hb

AMERICAN COUNCIL OF INDEPENDENT LABORATORIES INC.

THE OIL SHALE CORPORATION

INTER OFFICE MEMORANDUM

LOS ANGELES ☐
DENVER ☐
GOLDEN ☒
NEW YORK ☐

LABORATORY DATA LETTER 75-11

FROM: F. C. Haas

TO: File

DATE: January 14, 1975

FILE NO.:

SUBJECT: Water Analyses of Samples from C-b Tract, Hole 1-C

Project 197

Four string samples were taken from aquifer test hole 1-C. Samples were labelled (1) 1C String #1 1550'-1640', (2) Well 1-C String 2 (no footage or date), (3) 1C #2 String, 1450-1480, 11/7/74, and (4) 1C #3 String, 60'-1250'.

Major constituent analyses were done by Industrial Laboratories Company, Denver, and TOSCO, Rocky Flats. Trace metals and total organic carbon were done by Commercial Testing & Engineering Co., Golden. Radioactivity was done by Hazen Research, Inc., Golden.

There are no large discrepancies in the major constituent analyses given in Table 1.

Total organic carbon in all samples was less than 10 mg/l, therefore, no additional organic analysis was done.

Gross alpha was 4 p Ci/l or less and gross beta was less than 100 p Ci/l in all samples. No further radiochemical analysis was done.

FCH

FCH/as
Enc.

Approved (MTA)

cc: Messrs. Vawter, Spence, Schulman, Barney, Cleveland, Schillinger, Legatski, Matis and Tait

# TABLE 1

## MAJOR CONSTITUENT ANALYSES
## HOLE 1-C

| Component | #1 String 1550'-1640' | #2 String | #2 String 1450'-1480' | | #3 String 60'-1250' | |
|---|---|---|---|---|---|---|
| | Industrial | Industrial | Industrial | TOSCO | Industrial | TOSCO |
| Sodium, mg/l | 520 | 330 | 220 | 232 | 255 | 221 |
| Potassium, mg/l | NA | NA | NA | 6.4 | NA | 3.6 |
| Calcium, mg/l | 3.7 | 41 | 37 | 28 | 27 | 15 |
| Magnesium, mg/l | 4.1 | 14 | 27 | 29 | 20 | 23 |
| Sulfate, mg/l | 96 | 450 | 230 | 347 | 240 | 226 |
| Carbonate, mg/l | 160 | 59 | <0.1 | 7 | <0.1 | 9 |
| Bicarbonate, mg/l | 780 | 305 | 465 | 423 | 480 | 452 |
| Chloride, mg/l | 36 | 21 | 3 | 9 | <1 | 7 |
| Fluoride, mg/l | 10 | 3.6 | 8.8 | 4 | 9.2 | 6.4 |
| $\Sigma$Cations, meq/l | 23.14 | 17.55 | 13.64 | 14.03 | 14.09 | 12.30 |
| $\Sigma$Anions, meq/l | 21.73 | 17.11 | 13.10 | 14.83 | 13.35 | 12.93 |
| % Difference | 3.1 | 1.3 | 2.0 | 2.8 | 2.7 | 2.5 |
| Silica, mg/l | 12 | 13 | 15 | 16 | 17 | 18 |
| pH | 9.0 | 8.9 | 7.9 | 8.5 | 7.8 | 8.6 |
| Calculated TDS, mg/l | 1224 | 1080 | 769 | 885 | 803 | 750 |

THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211
TELEPHONE 455-3641

## ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY
2 Park Central, Suite 555
1515 Arapahoe Street
Denver, Colorado 80202

Attn: John Matis

**DATE RECEIVED:** 11/9/74
**DATE REPORTED:** 12/19/74

**LAB. NUMBER:** 4515

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

**SAMPLE MARKED:** Cb at 1C ~~Spring~~ String #1 1550-1640

**ANALYSIS:**

| | MILLIGRAMS PER LITER | | MILLI-EQUIVALENTS |
|---|---|---|---|
| Calcium | 3.7 | | 0.185 |
| Magnesium | 4.1 | | 0.337 |
| Sodium | 520 | Σ Cations = 23.14 | 22.620 |
| Carbonate | 160 | Σ Anions = 21.73 | 5.395 |
| Bicarbonate | 780 | % Diff. = 3.1 | 12.792 |
| Chloride | 36 | | 1.015 |
| Sulfate | 96 | | 1.997 |
| Nitrate | Less than 0.1 | | --- |
| Phosphate | Less than 0.1 | | --- |
| Silicon dioxide | 12 | | 0.400 |
| Iron | 0.2 | | --- |
| Fluoride | 10 | | 0.526 |

| | | | MILLIGRAMS PER LITER |
|---|---|---|---|
| P. alkalinity, in terms of calcium carbonate | --- | | |
| MO alkalinity, in terms of calcium carbonate | --- | Aluminum | Less than 0.1 |
| Hardness, in terms of | | Copper | Less than 0.1 |
| calcium carbonate | 26 | Cadmium | Less than 0.01 |
| Total dissolved solids | 1,105 | Lead | Less than 0.05 |
| (calculated) | | Manganese | Less than 0.05 |
| Ammonia-nitrogen | 0.12 | Silver | Less than 0.05 |
| Lithium | Less than 0.5 | Zinc | Less than 0.5 |
| Barium | Less than 1.0 | Mercury | Less than 0.01 |
| Hexavalent chromium | Less than 0.05 | | |
| Arsenic | 0.01 | | |
| | | pH | 9.0 |
| Selenium | Less than 0.01 | | |
| Boron | 1.1 | Specific conductance | |
| Hydroxide | Less than 0.1 | 1,420 micromhos per cc | |

THE INDUSTRIAL LABORATORIES COMPA

H. Paul

CHEMIST

EMBERS OF:

AMERICAN ASS'N OF CEREAL CHEMISTS
AMERICAN CHEMICAL SOCIETY
AMERICAN OIL CHEMISTS' SOCIETY
ASS'N OF OFFICIAL RACING CHEMISTS
BAKERY ENGINEERS OF AMERICA
INSTITUTE OF FOOD TECHNOLOGY
SIGMA XI

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THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211
TELEPHONE 455-3641

ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY
2 Park Central, Suite 555
1515 Arapahoe Street
Denver, Colorado 80202
Attn: John Matis

DATE RECEIVED: 11/1/74
DATE REPORTED: 12/9/74

LAB. NUMBER: 4322

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

AMPLE MARKED: Well 1-C String #2

ANALYSIS:

| | MILLIGRAMS PER LITER | | MILLI-EQUIVALENTS |
|---|---|---|---|
| Calcium | 41 | | 2.046 |
| Magnesium | 14 | | 1.152 |
| Sodium | 330 | Σ Cations = 17.55 | 14.355 |
| Carbonate | 59 | Σ Anions = 17.11 | 1.965 |
| Bicarbonate | 305 | % Diff. = 1.3 | 5.002 |
| Chloride | 21 | | 0.592 |
| Sulfate | 450 | | 9.360 |
| Nitrate | 1.0 | | --- |
| Phosphate | Less than 0.1 | | --- |
| Silicon dioxide | 13 | | 0.433 |
| Iron | 1.3 | | --- |
| Fluoride | 3.6 | | |
| P. alkalinity, in terms of calcium carbonate | ---- | | |
| MO alkalinity, in terms of calcium carbonate | | | |
| Hardness, in terms of calcium carbonate | 160 | | |
| Total dissolved solids (calculated) | 1,080 | | |
| Lithium | Less than 0.5 | | |
| Kjeldahl nitrogen | 0.6 | | |
| Ammonia-nitrogen | 0.4 | | |
| Barium | Less than 1.0 | | |
| Hexavalent chromium | Less than 0.01 | | |
| Arsenic | Less than 0.01 | | |
| Selenium | Less than 0.01 | | |
| Boron | 1.7 | | |

| | MILLIGRAMS PER LITER |
|---|---|
| Hydroxide | Less than 0.1 |
| Aluminum | Less than 0.05 |
| Copper | 0.4 |
| Cadmium | Less than 0.01 |
| Lead | 0.15 ~~1.5~~ |
| Manganese | 0.44 |
| Silver | Less than 0.01 |
| Zinc | 1.0 ~~10~~ |
| Mercury | Less than 0.01 |

pH 8.9
Specific conductance 1,420 micromhos per cc

BERS OF:
MERICAN ASS'N OF CEREAL CHEMISTS
MERICAN CHEMICAL SOCIETY
MERICAN OIL CHEMISTS' SOCIETY
SS'N OF OFFICIAL RACING CHEMISTS
KERY ENGINEERS OF AMERICA
STITUTE OF FOOD TECHNOLOGY
CMA XI

THE INDUSTRIAL LABORATORIES COMPANY
Paul
CHEMIST

# THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211
TELEPHONE 455-3641

ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY
John Matis

**DATE RECEIVED:** 11/9/74
**DATE REPORTED:** 12/19/74

**LAB. NUMBER:** 4516

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

**AMPLE MARKED:** Cb at 1C #2 ~~Spring~~ String 1450-1480 11/7/74

**ANALYSIS:**

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 37 | 1.846 |
| Magnesium | 27 | 2.222 |
| Sodium | 220 | 9.570 |
| Carbonate | Less than 0.1 | --- |
| Bicarbonate | 465 | 7.626 |
| Chloride | 3 | --- |
| Sulfate | 230 | 4.992 |
| Nitrate | Less than 0.1 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 15 | 0.500 |
| Iron | 0.18 | --- |
| Fluoride | 8.8 | 0.484 |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 200 | |
| Total dissolved solids (calculated) | 810 | |

$\Sigma$ Cations = 13.64
$\Sigma$ Anions = 13.10
% Diff. = 2.0

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | Less than 0.1 |
| Copper | Less than 0.1 |
| Cadmium | Less than 0.01 |
| Lead | Less than 0.05 |
| Manganese | 0.06 |
| Silver | Less than 0.05 |
| Zinc | Less than 0.5 |
| Mercury | Less than 0.01 |

| | |
|---|---|
| Ammonia-nitrogen | 0.17 |
| Lithium | Less than 0.5 |
| Barium | Less than 1.0 |
| Hexavalent chromium | Less than 0.05 |
| Arsenic | 0.01 |
| Selenium | Less than 0.01 |
| Boron | 1.4 |
| Hydroxide | Less than 0.1 |

pH 7.9
Specific conductance
1,350 micromhos per cc

THE INDUSTRIAL LABORATORIES COMPAN
H. Paul [illegible]
CHEMIST

EMBERS OF:
AMERICAN ASS'N OF CEREAL CHEMISTS
AMERICAN CHEMICAL SOCIETY
AMERICAN OIL CHEMISTS' SOCIETY
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BAKERY ENGINEERS OF AMERICA
INSTITUTE OF FOOD TECHNOLOGY
SIGMA XI

IS REPORT IS NOT TO BE REPRODUCED, IN WHOLE OR IN PART, FOR ADVERTISING PURPOSES WITHOUT OBTAINING PRIOR WRITTEN AUTHORIZATI

THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211

TELEPHONE 455-3641

## ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY

DATE RECEIVED: 11/9/74
DATE REPORTED: 12/19/74

LAB. NUMBER: 4517

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

SAMPLE MARKED: Cb at 1C #3 ~~Spring~~ String 60 feet-1,250 feet

ANALYSIS:

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 27 | 1.347 |
| Magnesium | 20 | 1.646 |
| Sodium | 255 | 11.093 |
| Carbonate | Less than 0.1 | ---- |
| Bicarbonate | 480 | 7.872 |
| Chloride | Less than 1 | --- |
| Sulfate | 240 | 4.992 |
| Nitrate | Less than 0.1 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 17 | 0.566 |
| Iron | 0.28 | --- |
| Fluoride | 9.2 | 0.484 |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 150 | |
| Total dissolved solids (calculated) | 800 | |
| Ammonia-nitrogen | 0.23 | |
| Lithium | Less than 0.5 | |
| Barium | Less than 1.0 | |
| Hexavalent chromium | Less than 0.05 | |
| Arsenic | 0.02 | |
| Selenium | Less than 0.01 | |
| Boron | 1.3 | |
| Hydroxide | Less than 0.1 | |

$\Sigma$ Cations = 14.09
$\Sigma$ Anions = 13.35
% Diff. = 2.7

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | Less than 0.1 |
| Copper | 0.1 |
| Cadmium | Less than 0.01 |
| Lead | Less than 0.05 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.05 |
| Zinc | Less than 0.5 |
| Mercury | Less than 0.01 |

pH 7.8
Specific conductance
1,200 micromhos per cc

THE INDUSTRIAL LABORATORIES COMPANY

CHEMIST

EMBERS OF:

AMERICAN ASS'N OF CEREAL CHEMISTS
AMERICAN CHEMICAL SOCIETY
AMERICAN OIL CHEMISTS' SOCIETY
ASS'N OF OFFICIAL RACING CHEMISTS
BAKERY ENGINEERS OF AMERICA
INSTITUTE OF FOOD TECHNOLOGY
SIGMA XI

IS REPORT IS NOT TO BE REPRODUCED, IN WHOLE OR IN PART, FOR ADVERTISING PURPOSES WITHOUT OBTAINING PRIOR WRITTEN AUTHORIZATION

CABLE ADDRESS COMTE

COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434

SINCE 1908

Reply to
Instrumental Analysis Division
14335 West 44th Avenue
Golden, Colorado 80401

Phone: 303-278-9521

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DEC 19 1974
TOSCO/GOLDEN

16 December 74

Mr. Frank Haas
The Oil Shale Corp.
18200 West Hiway 72
Golden, CO 80401

RE: IAD #97-163-002-18

## ANALYTICAL REPORT

| | TOC * mg/liter | Nitrate mg/liter |
|---|---|---|
| String #1 Sg-11 11-2-74 | 38 | Interference |
| Sg-19 11-1-74 | <1 | 0.075 |
| Sg-18 11-1-74 | <1 | 0.073 |
| ✓Arco c-b at 1C String #1-1550-1640 Deepest | <1 | 0.15 |
| ✓Arco c-b at 1C String #2-1450-1480 | <1 | 0.085 |
| ✓Arco c-b at 1C String #3-60'-1250' | <1 | 0.038 |

*Test performed on samples marked "Regular"

Charles R. Wilson
Charles R. Wilson
Analyst

M. L. Jacobs
Approved by:
M. L. Jacobs, Ph.D.
Divisional Manager

CRW/hb

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434

SINCE 1908

Reply to
Instrumental Analysis Division
14335 West 44th Avenue
Golden, Colorado 80401

Phone: 303-278-9521

20 November 74

Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, CO 80401

Re: IAD #97-153-002-04

ANALYTICAL REPORT

| | TOC* mg/liter | Nitrates** mg/liter N |
|---|---|---|
| Aquifer Test #1 after pumping 15 hrs. | <1 | 0.34 |
| ✓ Well 1-C String #2 | 8 | 0.10 |
| ARCO SG #18-A T.D. 1330' | <1 | 0.22 |
| ARCO SG-9 2750' | <1 | 0.056 |

*Test performed on samples marked "Regular" and run by an outside laboratory.

**Test performed on samples marked "Hg for N"

Charles R. Wilson
Charles R. Wilson
Analyst

M. L. Jacobs
Approved by:
M. L. Jacobs Ph.D.
Divisional Manager

CRW/hb

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TOSCO-GOLDEN

CHICAGO, IL • CHARLESTON, WV • CLARKSBURG, WV • CLEVELAND, OH • NORFOLK, VA • TERRE HAUTE, IN • HENDERSON, KY • DENVER, CO • BIRMINGHAM, AL • VANCOUVER, B.C. CAN.

**COMMERCIAL TESTING & ENGINEERING CO.**
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. Frank Haas
TOSCO
18200 West Hiway 72
Golden, CO 80401

Date: 16 December 74

Analyst: S. Sweeney

P. O. No.:

Sample No.: ARCO c-b at 1C String #1-1550-1640 Deepest Metal & Acid

IAD No.: 97-163-002-18

CONCENTRATION IN µg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | 0.003 |
| Thorium | | Gadolinium | | Molybdenum | 0.07 | Titanium | 0.08 |
| Bismuth | | Europium | | Niobium | | Scandium | 0.002 |
| Lead | 0.02 | Samarium | | Zirconium | 0.004 | Calcium | * |
| Thallium | | Neodymium | | Yttrium | | Potassium | * |
| Mercury | ** 0.0019 | Praseodymium | | Strontium | 0.4 | Chlorine | * |
| Gold | | Cerium | | Rubidium | 0.1 | Sulfur | * |
| Platinum | | Lanthanum | 0.007 | Bromine | 0.05 | Phosphorus | 1 |
| Iridium | | Barium | 0.04 | Selenium | | Silicon | * |
| Osmium | | Cesium | 0.07 | Arsenic | 0.03 | Aluminum | 0.9 |
| Rhenium | | Iodine | 0.006 | Germanium | | Magnesium | * |
| Tungsten | | Tellurium | | Gallium | 0.002 | Sodium | * |
| Tantalum | | Antimony | 0.03 | Zinc | 0.2 | Fluorine | * |
| Hafnium | | Tin | STD | Copper | 0.1 | Oxygen | NR |
| Lutetium | | Indium | | Nickel | 0.02 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | 0.006 | Carbon | NR |
| Thulium | | Silver | | Iron | 0.6 | Boron | 0.1 |
| Erbium | | Palladium | | Manganese | 0.06 | Beryllium | <0.001 |
| Holmium | | Rhodium | | Chromium | 0.003 | Lithium | 5 |
| Dysprosium | | | | | | Hydrogen | NR |

NR — Not Reported
All elements not reported <0.003 µg/ml
*Not reported upon request
**Flameless atomic absorption

Approved:

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 • AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. Frank Haas
TOSCO
18200 West Hiway 72
Golden, CO 80401

Date: 16 December 74

Analyst: S. Sweeney

P. O. No.:

Sample No.: ARCO c-b at 1C String #2-1450-1480
Metal & Acid

IAD No.: 97-163-002-18

CONCENTRATION IN μg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | 0.002 |
| Thorium | | Gadolinium | | Molybdenum | 0.1 | Titanium | 0.1 |
| Bismuth | | Europium | | Niobium | | Scandium | 0.003 |
| Lead | 0.03 | Samarium | | Zirconium | | Calcium | * |
| Thallium | | Neodymium | | Yttrium | | Potassium | * |
| Mercury | ** 0.0009 | Praseodymium | | Strontium | 5 | Chlorine | * |
| Gold | | Cerium | | Rubidium | 0.05 | Sulfur | * |
| Platinum | | Lanthanum | | Bromine | 0.03 | Phosphorus | 0.2 |
| Iridium | | Barium | 0.1 | Selenium | | Silicon | * |
| Osmium | | Cesium | 0.02 | Arsenic | 0.05 | Aluminum | 0.5 |
| Rhenium | | Iodine | 0.01 | Germanium | | Magnesium | * |
| Tungsten | | Tellurium | | Gallium | | Sodium | * |
| Tantalum | | Antimony | | Zinc | 0.05 | Fluorine | * |
| Hafnium | | Tin | | Copper | 0.03 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 0.006 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | 0.003 | Carbon | NR |
| Thulium | | Silver | | Iron | 0.5 | Boron | 0.2 |
| Erbium | | Palladium | | Manganese | 0.2 | Beryllium | 0.002 |
| Holmium | | Rhodium | | Chromium | 0.005 | Lithium | 4 |
| Dysprosium | | | | | | Hydrogen | NR |

NR — Not Reported
All elements not reported <0.003 μg/ml II B-177
*Not reported upon request
**Flameless Atomic Absorption

Approved:

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST AVENUE, GOLDEN, COLORADO, 80401, PHONE: 303-278-9521

To: Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, CO 80401

Date: 20 November 74

Analyst: S. Sweeney

P. O. No.:

Sample No.: Well 1-C String #2 ***

IAD No.: 97-153-002-04

CONCENTRATION IN ~~PPM WEIGHT~~ μg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | 0.004 |
| Thorium | | Gadolinium | | Molybdenum | 0.09 | Titanium | 0.06 |
| Bismuth | | Europium | | Niobium | | Scandium | 0.01 |
| Lead | 0.2 | Samarium | | Zirconium | | Calcium | * |
| Thallium | | Neodymium | | Yttrium | | Potassium | * |
| Mercury ** | 0.003 | Praseodymium | | Strontium | 0.3 | Chlorine | * |
| Gold | | Cerium | 0.003 | Rubidium | 0.02 | Sulfur | * |
| Platinum | | Lanthanum | 0.01 | Bromine | 0.003 | Phosphorus | 0.05 |
| Iridium | | Barium | 0.02 | Selenium | | Silicon | * |
| Osmium | | Cesium | | Arsenic | 0.02 | Aluminum | 0.2 |
| Rhenium | | Iodine | | Germanium | | Magnesium | * |
| Tungsten | | Tellurium | | Gallium | | Sodium | * |
| Tantalum | | Antimony | | Zinc | 0.1 | Fluorine | * |
| Hafnium | | Tin | | Copper | 0.2 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 0.01 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | 0.005 | Carbon | NR |
| Thulium | | Silver | | Iron | ≃7 | Boron | 0.01 |
| Erbium | | Palladium | | Manganese | 0.2 | Beryllium | <0.001 |
| Holmium | | Rhodium | | Chromium | 0.02 | Lithium | 0.6 |
| Dysprosium | | | | | | Hydrogen | NR |

II B-178

NR — Not Reported
All elements not reported ~~<0.1 ppm weight~~ <0.008 μg/ml
*Not reported upon request
**Flameless Atomic Absorption

Approved: M J Jacobs

***Sample was filtered through a 0.45 m filter before running

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. Frank Haas
TOSCO
18200 West Hiway 72
Golden, CO 80401

Date: 16 December 74

Analyst: S. Sweeney

P. O. No.:

Sample No.: ARCO c-b at 1C String #3-60'-1250'
Metal & Acid

IAD No.: 97-163-002-18

CONCENTRATION IN μg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | <0.001 |
| Thorium | | Gadolinium | | Molybdenum | 0.02 | Titanium | 0.08 |
| Bismuth | | Europium | | Niobium | | Scandium | 0.002 |
| Lead | 0.01 | Samarium | | Zirconium | | Calcium | * |
| Thallium | | Neodymium | | Yttrium | | Potassium | * |
| Mercury | ** 0.0008 | Praseodymium | | Strontium | 2 | Chlorine | * |
| Gold | | Cerium | | Rubidium | 0.01 | Sulfur | * |
| Platinum | | Lanthanum | 0.002 | Bromine | 0.02 | Phosphorus | 0.3 |
| Iridium | | Barium | 0.02 | Selenium | | Silicon | * |
| Osmium | | Cesium | | Arsenic | 0.06 | Aluminum | 0.9 |
| Rhenium | | Iodine | 0.002 | Germanium | | Magnesium | * |
| Tungsten | | Tellurium | | Gallium | | Sodium | * |
| Tantalum | | Antimony | | Zinc | 0.03 | Fluorine | * |
| Hafnium | | Tin | | Copper | 0.03 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 0.01 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | 0.002 | Carbon | NR |
| Thulium | | Silver | | Iron | 0.6 | Boron | 0.1 |
| Erbium | | Palladium | | Manganese | 0.2 | Beryllium | |
| Holmium | | Rhodium | | Chromium | 0.006 | Lithium | 0.5 |
| Dysprosium | | | | | | Hydrogen | NR |

NR — Not Reported
All elements not reported <0.002 μg/ml
*Not reported upon request
**Flameless Atomic Absorption

Approved:

HAZEN RESEARCH, INC.
4601 Indiana Street
Golden, Colorado 80401

Mr. Frank C. Haas
The Oil Shale Corporation
18200 West Highway 72
Golden, Colorado 80401

Date: December 20, 1974
HRI Project No. 535
HRI Series No. 7583
Samples received: Nov. 8, 1974

## REPORT OF ANALYSIS

| Analysis No. | Sample Designation | α Total | pCi/l ± | α Precision* | β Total | pCi/l ± | β Precision* | $Ra^{226}$ | pCi/l ± | Precision* |
|---|---|---|---|---|---|---|---|---|---|---|
| 7583-1 ✓ | 1-C string #1 1550-1640 | 4.0 | ± | 2.1 | 41 | ± | 10 | | | |
| -2 ✓ | 1-C string #2 1450-1480 | 1.6 | ± | 1.7 | 0 | ± | 9 | | | |
| -3 ✓ | 1-C string #3 60-1250 | 2.0 | ± | 1.7 | 2 | ± | 9 | | | |
| -4 | SG-11 11/2 | 43 | ± | 40 | 390 | ± | 170 | 27 | ± | 5 |
| -5 | SG-18 11/1 | 3.6 | ± | 2.3 | 0 | ± | 11 | | | |
| -6 | SG-19 11/1 | 7.9 | ± | 4.4 | 33 | ± | 19 | 0.1 | ± | 0.7 |

*Variability of the radioactive disintegration process (counting error) at the 95% confidence level, $1.96\sigma$

By:
John C. Jarvis
Manager, Analytical Laboratory

ljb

HAZEN RESEARCH, INC.
4601 Indiana Street
Golden, Colorado 80401

Mr. F. C. Haas
The Oil Shale Corporation
18200 West Highway 72
Golden, Colorado 80401

Date: December 3, 1974
HRI Project No. 535
HRI Series No. 7559
Samples received: November 1, 1974

# REPORT OF ANALYSIS

| Analysis No. | Sample Designation | α Total | pCi/l ± | α Precision* | β Total | pCi/l ± | β Precision* | $Ra^{226}$ | pCi/l ± | Precision* |
|---|---|---|---|---|---|---|---|---|---|---|
| 7559-1 | Aquifer Test #1 Pumped 15 hrs. | 4.2 | ± | 2.3 | 0 | ± | 11 | 0.3 | ± | 0.5 |
| -2✓ | Well #1-C String #2 | 0.6 | ± | 3.4 | 9 | ± | 12 | | | |
| -3 | SG-9 2750' | 5.5 | ± | 2.6 | 0 | ± | 11 | 0 | ± | 0.4 |
| -4 | SG-18-A TD 1380 | 8.0 | ± | 3.3 | 0 | ± | 11 | 0.1 | ± | 0.4 |

II B-181

By: John C. Jarvis
John C. Jarvis
Manager, Analytical Laboratory

ljb

*Variability of the radioactive disintegration process (counting error) at the 95% confidence level, 1.96σ

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DENVER ☒
LOS ANGELES ☐

# THE OIL SHALE CORPORATION

## INTER OFFICE MEMORANDUM

LABORATORY DATA LETTER 75-28

FROM: F. C. Haas
TO: File

DATE: February 14, 1975
FILE NO.: 5100-3
SUBJECT: Analyses of Water Samples from C-b Tract, Core Hole SG-9 (String Nos. 1 and 2)

Project No. 197

Two water samples were taken from Core Hole SG-9; one sample from String No. 1 and the other from String No. 2. The samples were analyzed for major and minor constituents, trace metals, radioactivity and total organic carbon. Major constituents were done by Industrial Laboratories, Denver, Colorado, and TOSCO, Rocky Flats. Minor constituents were done by Commercial Testing & Engineering, Golden, Colorado. Radioactivity was done by Hazen Research, Inc., Golden, Colorado. Results of the analyses are attached.

There are no major discrepancies in the major constituent analyses.

Total organic carbon in both samples was less than 10 mg/liter in all samples. Gross alpha in String No. 1 was greater than 4 pCi/l, therefore, $Ra_{226}$ was determined. No $Ra_{226}$ was found.

FCH/aw
Encs.

Approved (MTA)

cc: R. G. Vawter
H. M. Spence
B. L. Schulman
T. H. Cleveland
A. W. Schillinger
M. W. Legatski (ARCO)
J. R. Matis (ARCO)
D. B. Tait (ARCO)

## Table 1

## MAJOR CONSTITUENT ANALYSES

| Component | String No. 1 |  | String No. 2 |  |
|---|---|---|---|---|
|  | Industrial | TOSCO | Industrial | TOSCO |
| Sodium, mg/l | 400 | 414 | 310 | 271 |
| Potassium, mg/l | NA | 5.3 | NA | 4.8 |
| Calcium, mg/l | 19 | NA | 117 | NA |
| Magnesium, mg/l | 7.5 | 7.6 | 68 | 100 |
| Sulfate, mg/l | 51 | 67 | 375 | 431 |
| Carbonate, mg/l | 72 | 17 | 42 | 12 |
| Bicarbonate, mg/l | 860 | 972 | 690 | 739 |
| Chloride, mg/l | 44 | 28 | 60 | 49 |
| Fluoride, mg/l | 18 | 17 | 0.2 | 2.2 |
| $\sum$ Cations, meq/l | 18.97 | — | 24.92 | — |
| $\sum$ Anions, meq/l | 19.75 | — | 24.98 | — |
| % Difference | 2.0 | — | <0.1 | — |
| Silica, mg/l | 15 | 13 | 22 | 20 |
| pH | 8.6 | 8.4 | 8.8 | 8.5 |
| Conductivity, μmhos/cm | 1500 | 1400 | 1640 | 1650 |
| Calculated TDS, mg/l | 1048 | — | 1332 | — |

NA - Not Analyzed.

# THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211
TELEPHONE 455-3641

ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY
2 Park Central, Suite 555
1515 Arapahoe Street
Denver, Colorado 80202
Attn: John Matis

DATE RECEIVED: 12/6/74
DATE REPORTED: 12/20/74

LAB. NUMBER: 5247

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

SAMPLE MARKED: SG-9 String #1

ANALYSIS:

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 19 | 0.948 |
| Magnesium | 7.5 | 0.617 |
| Sodium | 400 | 17.400 |
| Carbonate | 72 | 2.398 |
| Bicarbonate | 860 | 14.104 |
| Chloride | 44 | 1.241 |
| Sulfate | 51 | 1.061 |
| Nitrate | Less than 0.1 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 15 | 0.500 |
| Iron | 0.68 | --- |
| Fluoride | 18 | 0.947 |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 78 | |
| Total dissolved solids (calculated) | 1,060 | |
| Ammonia-nitrogen | 0.1 | |
| Lithium | Less than 0.5 | |
| Barium | Less than 1 | |
| Hexavalent chromium | Less than 0.01 | |
| Arsenic | Less than 0.01 | |
| Selenium | Less than 0.01 | |
| Boron | 4.9 | |
| Hydroxide | Less than 0.1 | |

$\sum$ Cations = 18.97
$\sum$ Anions = 19.75
% Difference = 2.0

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | Less than 0.1 |
| Copper | Less than 0.1 |
| Cadmium | Less than 0.01 |
| Lead | 0.24 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.05 |
| Zinc | Less than 0.5 |
| Mercury | Less than 0.01 |

pH 8.6
Specific conductance
1,500 micromhos per cc

THE INDUSTRIAL LABORATORIES COMPANY

CHEMIST

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AMERICAN CHEMICAL SOCIETY
AMERICAN OIL CHEMISTS' SOCIETY
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INSTITUTE OF FOOD TECHNOLOGY
SIGMA XI

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# THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211
TELEPHONE 455-3641

ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY
John Matis

DATE RECEIVED: 12/6/74
DATE REPORTED: 12/20/74

LAB. NUMBER: 5248

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

SAMPLE MARKED: SG 9 - String #2

ANALYSIS:

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 117 | 5.838 |
| Magnesium | 68 | 5.596 |
| Sodium | 310 | 13.485 |
| Carbonate | 42 | 1.399 |
| Bicarbonate | 690 | 11.316 |
| Chloride | 60 | 1.692 |
| Sulfate | 375 | 10.575 |
| Nitrate | 0.4 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 22 | --- |
| Iron | 0.18 | |
| Fluoride | 2 | |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 570 | |
| Total dissolved solids (calculated) | 1,330 | |
| Ammonia-nitrogen | 0.2 | |
| Lithium | Less than 0.5 | |
| Barium | Less than 1 | |
| Hexavalent chromium | Less than 0.01 | |
| Arsenic | Less than 0.01 | |
| Selenium | Less than 0.01 | |
| Boron | 1.5 | |
| Hydroxide | Less than 0.1 | |

$\sum$ Cations = 24.92
$\sum$ Anions = 24.98
% Difference = <0.1

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | Less than 0.1 |
| Copper | Less than 0.1 |
| Cadmium | Less than 0.01 |
| Lead | Less than 0.05 |
| Manganese | 0.15 |
| Silver | Less than 0.05 |
| Zinc | Less than 0.5 |
| Mercury | Less than 0.01 |

pH 8.8
Specific conductance
1,640 micromhos per cc

MEMBER OF:

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AMERICAN CHEMICAL SOCIETY
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BAKERY ENGINEERS OF AMERICA
INSTITUTE OF FOOD TECHNOLOGY
SIGMA XI

THE INDUSTRIAL LABORATORIES COMPANY

CHEMIST

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**COMMERCIAL TESTING & ENGINEERING CO.**
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, Colorado 80401

Date: 13 February 75

Analyst: S. Sweeney

P. O. No.: CORRECTED COPY
Sample No.: Environmental Sg #9 - String 1

IAD No.: 97-190-002-03

CONCENTRATION IN μg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | 0.002 |
| Thorium | | Gadolinium | | Molybdenum | 0.07 | Titanium | 0.1 |
| Bismuth | | Europium | | Niobium | | Scandium | 0.002 |
| Lead | 0.01 | Samarium | | Zirconium | | Calcium | * |
| Thallium | | Neodymium | | Yttrium | | Potassium | * |
| Mercury | NR | Praseodymium | | Strontium | 2 | Chlorine | * |
| Gold | | Cerium | 0.002 | Rubidium | 0.05 | Sulfur | * |
| Platinum | | Lanthanum | 0.001 | Bromine | 0.03 | Phosphorus | 0.3 |
| Iridium | | Barium | 0.08 | Selenium | 0.005 | Silicon | * |
| Osmium | | Cesium | 0.01 | Arsenic | 0.02 | Aluminum | 0.4 |
| Rhenium | | Iodine | 0.01 | Germanium | | Magnesium | * |
| Tungsten | 0.01 | Tellurium | | Gallium | 0.003 | Sodium | * |
| Tantalum | | Antimony | 0.009 | Zinc | 1 | Fluorine | * |
| Hafnium | | Tin | | Copper | 0.03 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 0.003 | Nitrogen | NR |
| Ytterbium | | Cadmium | 0.1 | Cobalt | 0.002 | Carbon | NR |
| Thulium | | Silver | 0.009 | Iron | 2 | Boron | 1 |
| Erbium | | Palladium | | Manganese | 0.09 | Beryllium | 0.001 |
| Holmium | | Rhodium | | Chromium | 0.006 | Lithium | 0.22** |
| Dysprosium | | | | | | Hydrogen | NR |

* Not reported upon request
** Atomic Absorption
NR — Not Reported
All elements not reported <0.002 μg/ml

Approved:

# COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES · 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. Frnak Haas
The Oil Shele Corporation
18200 West Hiway 72
Golden, Colorado 80401

Date: 13 February 75

Analyst: S. Sweeney

P. O. No.: CORRECTED COPY
Sample No.: Environmental Sg #9 - String #2

IAD No.: 97-190-002-03

CONCENTRATION IN µg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | 0.004 |
| Thorium | | Gadolinium | | Molybdenum | 0.08 | Titanium | 0.05 |
| Bismuth | | Europium | | Niobium | | Scandium | 0.009 |
| Lead | ≤0.02 | Samarium | | Zirconium | | Calcium | * |
| Thallium | | Neodymium | | Yttrium | | Potassium | * |
| Mercury | NR | Praseodymium | | Strontium | 3 | Chlorine | * |
| Gold | | Cerium | | Rubidium | 0.02 | Sulfur | * |
| Platinum | | Lanthanum | | Bromine | 0.03 | Phosphorus | 0.2 |
| Iridium | | Barium | 0.07 | Selenium | 0.009 | Silicon | * |
| Osmium | | Cesium | 0.005 | Arsenic | 0.009 | Aluminum | 0.7 |
| Rhenium | | Iodine | 0.005 | Germanium | | Magnesium | * |
| Tungsten | 0.01 | Tellurium | | Gallium | | Sodium | * |
| Tantalum | | Antimony | 0.006 | Zinc | 0.1 | Fluorine | * |
| Hafnium | | Tin | | Copper | 0.03 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 0.02 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | 0.01 | Carbon | NR |
| Thulium | | Silver | | Iron | 0.5 | Boron | 1 |
| Erbium | | Palladium | | Manganese | 0.4 | Beryllium | 0.003 |
| Holmium | | Rhodium | | Chromium | 0.01 | Lithium | 0.27** |
| Dysprosium | | | | | | Hydrogen | NR |

* Not reported upon request
** Atomic Absorption
NR — Not Reported
All elements not reported <0.004 µg/ml

Approved:

CABLE ADDRESS COMTEC

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 • AREA CODE 312 726-8434

SINCE 1908

Reply to
Instrumental Analysis Division
14335 West 44th Avenue
Golden, Colorado 80401

Phone: 303-278-9521

10 January 75

Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, CO 80401

RE: IAD #97-190-002-03

## Analytical Report

| | TOC* mg/Liter |
|---|---|
| ✓ Environmental Sg #9 - String #1 | <1 |
| ✓ Environmental Sg #9 - String #2 | 8 |
| ARCO etal Sg #17 - Dst #8 1066-1116.7 | 2 |

*Test performed on water marked "Regular".
Outside laboratory

M. L. Jacobs, Ph.D.
Divisional Manager

MLJ/hb

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HAZEN R SEARCH, INC.
4601 Indiana Street
Golden, Colorado 80401

Mr. Frank C. Haas
The Oil Shale Corporation
18200 West Highway 72
Golden, Colorado 80401

Date: February 6, 1975
HRI Project No. 535
HRI Series No. 7726
Samples received: Dec. 16, 1974

# REPORT OF ANALYSIS

| Analysis No. | Sample Designation | pCi/l | | | | | | pCi/l | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | α Total | ± | α Precision* | β Total | ± | β Precision* | $^{226}$Ra | ± | Precision* |
| 7726-1 | SG#17 DST#8<br>1066-1116.7 | 1.7 | ± | 1.9 | 15 | ± | 10 | | | |
| -2 ✓ | SG-9 String #1 | 4.5 | ± | 2.8 | 0 | ± | 10 | 0 | ± | 1.1 |
| -3 ✓ | SG-9 String #2 | 2.3 | ± | 2.6 | 2 | ± | 11 | | | |

*Variability of the radioactive disintegration process (counting error) at the 95% confidence level, 1.96σ

By: John C. Jarvis
John C. Jarvis
Manager, Analytical Laboratory

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FEB 9 1975
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ljb

NEW YORK ☐
DENVER ☒
LOS ANGELES ☐

THE OIL SHALE CORPORATION
INTER OFFICE MEMORANDUM

LABORATORY DATA LETTER 75-41

FROM: F. C. Haas
TO: File

DATE: March 3, 1975
FILE NO.: 5100-3
SUBJECT: Analysis of Water Sample from Core Hole SG-11, String No. 1

Project No. 197

Attached are the analyses of a water sample from Core Hole SG-11, String No. 1.

Major constituent analyses were done by Industrial Laboratories, Denver, Colorado, and TOSCO, Rocky Flats. Minor constituents were done by Industrial Laboratories. Trace metals and total organic carbon were done by Commercial Testing & Engineering, Golden, Colorado. Radioactivity was done by Hazen Research, Inc., Golden, Colorado.

This water is similar in composition as the water from SG-17, DST-34, 2120-2170 feet. However, it does not contain the high nitrate or ammonia nitrogen.

Industrial Laboratories reported 0.8 mg/l boron (colorimetric), whereas Commercial Testing & Engineering reported greater or equal to 120 mg/l boron (spark source mass spectroscopy). TOSCO then set up a colorimetric procedure and found 315 mg/l boron. There are also discrepancies in the fluoride, lithium and barium analyses. Industrial Laboratories report 18 mg/l fluoride, whereas TOSCO found 48 mg/l. Industrial Laboratories reports <0.5 mg/l lithium, whereas Commercial Testing & Engineering reports ≥70 mg/l and TOSCO found 79 mg/l lithium. Industrial Laboratories found no barium, whereas Commercial Testing & Engineering found 5 mg/l. Industrial Laboratories has been advised of this and have checked it out (later samples show much better agreement, except for the boron).

The sample from String No. 1 contained 38 mg/l total organic carbon. A chloroform extraction removed 29 mg/l of organic material. Of this amount, organic bases were 0.6 mg/l, neutral compounds were 11.8 mg/l, phenolics were 5.0 mg/l and acidic compounds were 7.3 mg/l. The acidic material contained 2.93 percent sulfur. (Acidic material from shale oil contains 3.68 percent sulfur.) There was insufficient material to do a nitrogen on the organic bases. An extraction for polycyclic aromatics showed less than 1.3 mg/l.

Gross alpha was 43 pCi/l; $Ra_{226}$ was determined and found to be 27 pCi/l, which is well above Colorado drinking water standards. Gross beta was 390 pCi/l; analyses for $U_{Nat.}$ and $Th_{230}$ showed these elements to be absent.

FCH/aw
Encs.

Approved (MTA)

cc: R. G. Vawter
B. L. Schulman
H. M. Spence
T. H. Cleveland
A. W. Schillinger
M. W. Legatski (ARCO)
J. R. Matis (ARCO)
D. B. Tait (ARCO)

Table 1

## ANALYSES OF STRING NO. 1, SG-11

| Component | Laboratories | | |
|---|---|---|---|
| | Industrial | TOSCO | CT & E |
| Sodium, mg/l | 15,300 | 16,367 | |
| Potassium, mg/l | NA | 125 | |
| Calcium, mg/l | <0.1 | 6 | |
| Magnesium, mg/l | 12 | 14 | |
| Sulfate, mg/l | <4 | 2 | |
| Carbonate, mg/l | 1,320 | 1,962 | |
| Bicarbonate, mg/l | 25,900 | 21,594 | |
| Chloride, mg/l | 6,930 | 8,154 | |
| Fluoride, mg/l | 18 | 48 | |
| Lithium, mg/l | <0.5 | 79 | ≥70 |
| Borate, mg/l | 0.8 | 1,230 | ≥120 (B) |
| Barium, mg/l | <1 | NA | 5 |
| $\sum$Cations, meq/l | 667 | 727 | |
| $\sum$Anions, meq/l | 665 | 680 | |
| % Difference | 0.2 | 3.3 | |
| Silica, mg/l | 18 | 24 | |
| pH | 8.4 | 8.8 | |
| Calculated TDS, mg/l | 36,289 | 38,592 | |
| Conductivity, micromhos/cm | 40,000 | 40,000 | |

NA - Not Analyzed.

THE INDUSTRIAL LABORATORIES COMPANY
*Analytical and Consulting Chemists*
2600 WEST 29TH AVENUE
DENVER, COLORADO 80211
TELEPHONE 455-3641

ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY
John Matis

DATE RECEIVED: 11/9/74
DATE REPORTED: 12/19/74

LAB. NUMBER: 4518

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

SAMPLE MARKED: SG-11 11/2 String #1

ANALYSIS:

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | Less than 0.1 | --- |
| Magnesium | 12 | 0.988 |
| Sodium | 15,300 | 665.550 |
| Carbonate | 1,320 | 43.956 |
| Bicarbonate | 25,900 | 424.760 |
| Chloride | 6,930 | 195.426 |
| Sulfate | Less than 4 | --- |
| Nitrate | Less than 0.1 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 18 | 0.599 |
| Iron | 2.3 | --- |
| Fluoride | 18 | 0.316 |

$\Sigma$ Cations = 666.5
$\Sigma$ Anions = 664.5
% Difference = 0.2

| | MILLIGRAMS PER LITER |
|---|---|
| P. alkalinity, in terms of calcium carbonate | --- |
| MO alkalinity, in terms of calcium carbonate | --- |
| Hardness, in terms of calcium carbonate | 48 |
| Total dissolved solids (calculated) | 31,960 |
| Ammonia | Not preserved |
| Lithium | Less than 0.5 |
| Barium | Less than 1.0 |
| Hexavalent chromium | Less than 0.05 |
| Arsenic | Less than 0.01 |
| Selenium | Less than 0.01 |
| Boron | 0.8 |
| Hydroxide | Less than 0.1 |

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | Less than 0.1 |
| Copper | Less than 0.1 |
| Cadmium | Less than 0.01 |
| Lead | Less than 0.05 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.05 |
| Zinc | Less than 0.5 |
| Mercury | Less than 0.01 |

pH 8.4
Specific conductance
40,000 micromhos per cc

THE INDUSTRIAL LABORATORIES COMPANY
H. Paul
CHEMIST

II B-193

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SIGMA XI

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COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. Frank Haas
TOSCO
18200 West Hiway 72
Golden, CO 80401

Date: 16 December 74

Analyst: S. Sweeney

P. O. No.:

Sample No.: String #1 Sg-11 11-2-74
Metal & Acid

IAD No.: 97-163-002-18

CONCENTRATION IN µg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | 0.02 |
| Thorium | | Gadolinium | | Molybdenum | 0.01 | Titanium | 0.2 |
| Bismuth | | Europium | | Niobium | 0.01 | Scandium | 0.01 |
| Lead | 0.03 | Samarium | | Zirconium | 0.9 | Calcium | * |
| Thallium | | Neodymium | | Yttrium | 0.03 | Potassium | * |
| Mercury | ** 0.0026 | Praseodymium | | Strontium | 3 | Chlorine | * |
| Gold | | Cerium | | Rubidium | 0.04 | Sulfur | * |
| Platinum | | Lanthanum | 0.02 | Bromine | 0.8 | Phosphorus | 0.4 |
| Iridium | | Barium | 5 | Selenium | | Silicon | * |
| Osmium | | Cesium | 0.04 | Arsenic | 0.03 | Aluminum | 0.4 |
| Rhenium | | Iodine | 0.5 | Germanium | 0.05 | Magnesium | * |
| Tungsten | | Tellurium | | Gallium | 0.02 | Sodium | * |
| Tantalum | | Antimony | 0.008 | Zinc | 0.03 | Fluorine | * |
| Hafnium | | Tin | | Copper | 0.2 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | *** | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | 0.03 | Carbon | NR |
| Thulium | | Silver | | Iron | 3 | Boron | ≥120 |
| Erbium | | Palladium | | Manganese | 0.07 | Beryllium | 0.002 |
| Holmium | | Rhodium | | Chromium | 0.007 | Lithium | ≥70 |
| Dysprosium | | | | | | Hydrogen | NR |

NR – Not Reported
All elements not reported <0.006 µg/ml
*Not reported upon request
**Flameless Atomic Abosrption

Approved:

***Interference from NaCl molecules

CABLE ADDRESS COMTEC

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434

SINCE 1908

Reply to
Instrumental Analysis Division
14335 West 44th Avenue
Golden, Colorado 80401

Phone: 303-278-9521

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16 December 74

Mr. Frank Haas
The Oil Shale Corp.
18200 West Hiway 72
Golden, CO 80401

RE: IAD #97-163-002-18

## ANALYTICAL REPORT

| | TOC *<br>mg/liter | Nitrate<br>mg/liter |
|---|---|---|
| ✓ String #1 Sg-11 11-2-74 | 38 | Interference |
| Sg-19 11-1-74 | <1 | 0.075 |
| Sg-18 11-1-74 | <1 | 0.073 |
| Arco c-b at 1C String #1-1550-1640 Deepest | <1 | 0.15 |
| Arco c-b at 1C String #2-1450-1480 | <1 | 0.085 |
| Arco c-b at 1C String #3-60'-1250' | <1 | 0.038 |

*Test performed on samples marked "Regular"

Charles R. Wilson
Charles R. Wilson
Analyst

M. L. Jacobs
Approved by:
M. L. Jacobs, Ph.D.
Divisional Manager

CRW/hb

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HAZEN RESEARCH, INC.
4601 Indiana Street
Golden, Colorado 80401

Mr. Frank C. Haas
The Oil Shale Corporation
18200 West Highway 72
Golden, Colorado 80401

| | |
|---|---|
| Date: | December 20, 1974 |
| HRI Project No. | 535 |
| HRI Series No. | 7583 |
| Samples received: | Nov. 8, 1974 |

## REPORT OF ANALYSIS

| Analysis No. | Sample Designation | α Total | pCi/l ± | α Precision* | β Total | pCi/l ± | β Precision* | $Ra^{226}$ | ± | pCi/l Precision* |
|---|---|---|---|---|---|---|---|---|---|---|
| 7583-1 | 1-C string #1 1550-1640 | 4.0 | ± | 2.1 | 41 | ± | 10 | | | |
| -2 | 1-C string #2 1450-1480 | 1.6 | ± | 1.7 | 0 | ± | 9 | | | |
| -3 | 1-C string #3 60-1250 | 2.0 | ± | 1.7 | 2 | ± | 9 | | | |
| ✓ -4 | SG-11 11/2 String #1 | 43 | ± | 40 | 390 | ± | 170 | 27 | ± | 5 |
| -5 | SG-18 11/1 | 3.6 | ± | 2.3 | 0 | ± | 11 | | | |
| -6 | SG-19 11/1 | 7.9 | ± | 4.4 | 33 | ± | 19 | 0.1 | ± | 0.7 |

*Variability of the radioactive disintegration process (counting error) at the 95% confidence level, 1.96σ

By: John C. Jarvis
John C. Jarvis
Manager, Analytical Laboratory

ljb

HAZEN RESEARCH, INC.

4601 INDIANA STREET
GOLDEN, COLORADO • 80401
TELEPHONE 303/279-4501

## REPORT OF ANALYSIS

Mr. Frank C. Haas
The Oil Shale Corporation
18200 West Highway 72
Golden, Colorado 80401

Date: January 16, 1975

HRI Project No. 535
HRI Series No. 7583
Samples Rec'd Nov. 8, 1974

| Analysis No. | Sample Designation | pCi/l | | | μCi/ml** |
|---|---|---|---|---|---|
| | | $Th^{230}$ | ± | Precision* | U |
| 7583-4 | SG-11 11/2 | 0 | ± | 7.6 | $<10 \times 10^{-10}$ |

By: John C. Jarvis
John C. Jarvis
Manager, Analytical Laboratory

ljb

*Variability of the radioactive disintegration process (counting error) at the 95% confidence level, 1.96$\sigma$

**Uranium results reported assuming the activity of natural U = $6.77 \times 10^{-7}$ Ci/gm.

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# THE OIL SHALE CORPORATION

INTER OFFICE MEMORANDUM

LABORATORY DATA LETTER 75-10

FROM: F. C. Haas
TO: File

DATE: January 13, 1975
FILE NO.: 5100-3
SUBJECT: Analysis of Water Sample From C-b Tract, Core Hole SG-19

Project No. 197

At the request of J. R. Matis, one of the water samples from SG-19, which had previously been analyzed for major constituents was analyzed for trace metals, total organic carbon and radioactivity. The sample was labeled D. B. Tait, J.G.G., 11-1-74 (see Laboratory Data Letter 74-141). Results of the analysis are attached. Total organic carbon was less than 1 mg/l. Gross beta was less than 100 pCi/l. Gross alpha was greater than 4 pCi/l, therefore, $Ra_{226}$ was determined, but was found to be less than 4 pCi/l. These values would be acceptable in drinking water.

There is a typographical error in Laboratory Data Letter 74-141. The bicarbonate value in the above mentioned sample should be 1773 mg/l instead of 1173 mg/l.

This Laboratory Data Letter should be filed with Laboratory Data Letter 74-141.

FCH/aw
Encs.

Approved (MTA)

cc: R. G. Vawter
B. L. Schulman
J. H. Barney
H. M. Spence
T. H. Cleveland
A. W. Schillinger
M. W. Legatski (ARCO)
G. E. Davis (ARCO)
D. B. Tait (ARCO)
J. R. Matis (ARCO)

THE INDUSTRIAL LABORATORIES COMPANY
*Analytical and Consulting Chemists*
2600 WEST 29TH AVENUE
DENVER, COLORADO 80211
TELEPHONE 455-3641

ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY

DATE RECEIVED: 11/9/74
DATE REPORTED: 12/19/74

LAB. NUMBER: 4520

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

SAMPLE MARKED: SG-19 11/1

ANALYSIS:

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 6.6 | 0.329 |
| Magnesium | 2.9 | 0.239 |
| Sodium | 755 | 32.843 |
| Carbonate | 66 | 0.300 |
| Bicarbonate | 1,780 | 31.160 |
| Chloride | 10 | 0.282 |
| Sulfate | Less than 4 | --- |
| Nitrate | Less than 0.1 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 9 | 0.300 |
| Iron | Less than 0.05 | --- |
| Fluoride | 3.1 | |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 29 | |
| Total dissolved solids (calculated) | 1,810 | |
| Ammonia-nitrogen | 0.14 | |
| Lithium | Less than 0.5 | |
| Barium | Less than 1.0 | |
| Hexavalent chromium | Less than 0.05 | |
| Arsenic | Less than 0.01 | |
| Selenium | Less than 0.01 | |
| Boron | 2.0 | |
| Hydroxide | Less than 0.1 | |

$\sum$ Cations = 33.41
$\sum$ Anions = 31.76
% Difference = 2.5

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | 0.3 |
| Copper | Less than 0.1 |
| Cadmium | Less than 0.01 |
| Lead | Less than 0.05 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.05 |
| Mercury | Less than 0.01 |
| Zinc | Less than 0.05 |

pH 8.4
Specific conductance
2,750 micromhos per cc

THE INDUSTRIAL LABORATORIES COMPANY
CHEMIST

MBERS OF:
AMERICAN ASS'N OF CEREAL CHEMISTS
AMERICAN CHEMICAL SOCIETY
AMERICAN OIL CHEMISTS' SOCIETY
ASS'N OF OFFICIAL RACING CHEMISTS
BAKERY ENGINEERS OF AMERICA
INSTITUTE OF FOOD TECHNOLOGY
SIGMA XI

S REPORT IS NOT TO BE REPRODUCED, IN WHOLE OR IN PART, FOR ADVERTISING PURPOSES WITHOUT OBTAINING PRIOR WRITTEN AUTHORIZATION

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST 44TH AVENUE, GOLDEN, COLORADO 80401, PHONE: 303-278-9521

To: Mr. Frank Haas
TOSCO
18200 West Hiway 72
Golden, CO 80401

Date: 16 December 74

Analyst: S. Sweeney

P. O. No.:

Sample No.: Sg #19 11-1-74
Metal & Acid

IAD No.: 97-163-002-18

CONCENTRATION IN μg/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | ≤0.001 |
| Thorium | | Gadolinium | | Molybdenum | 0.003 | Titanium | 0.03 |
| Bismuth | | Europium | | Niobium | | Scandium | 0.001 |
| Lead | ≤0.008 | Samarium | | Zirconium | ≥0.002 | Calcium | * |
| Thallium | | Neodymium | | Yttrium | | Potassium | * |
| Mercury | ** 0.0019 | Praseodymium | | Strontium | 0.4 | Chlorine | * |
| Gold | | Cerium | | Rubidium | 0.005 | Sulfur | * |
| Platinum | | Lanthanum | | Bromine | 0.01 | Phosphorus | 0.06 |
| Iridium | | Barium | 0.2 | Selenium | | Silicon | * |
| Osmium | | Cesium | 0.001 | Arsenic | ≤0.001 | Aluminum | ***0.7 |
| Rhenium | | Iodine | 0.004 | Germanium | | Magnesium | * |
| Tungsten | | Tellurium | | Gallium | 0.002 | Sodium | * |
| Tantalum | | Antimony | | Zinc | 0.05 | Fluorine | * |
| Hafnium | | Tin | | Copper | 0.08 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 0.002 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | <0.001 | Carbon | NR |
| Thulium | | Silver | | Iron | 0.05 | Boron | ***0.7 |
| Erbium | | Palladium | | Manganese | 0.002 | Beryllium | |
| Holmium | | Rhodium | | Chromium | 0.002 | Lithium | 0.8 |
| Dysprosium | | | | | | Hydrogen | NR |

NR — Not Reported
All elements not reported <0. 002 μg/ml
*Not reported upon request
**Flameless Atomic Absorption

Approved: M J Jacobs

***Heterogeneous

CABLE ADDRESS COMTE

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434

SINCE 1908

Reply to
Instrumental Analysis Division
14335 West 44th Avenue
Golden, Colorado 80401

Phone: 303-278-9521

RECEIVED
DEC 19 1974
TOSCO/GOLDEN

16 December 74

Mr. Frank Haas
The Oil Shale Corp.
18200 West Hiway 72
Golden, CO 80401

RE: IAD #97-163-002-18

## ANALYTICAL REPORT

| | TOC * mg/liter | Nitrate mg/liter |
|---|---|---|
| String #1 Sg-11 11-2-74 | 38 | Interference |
| ✓ Sg-19 11-1-74 | <1 | 0.075 |
| Sg-18 11-1-74 | <1 | 0.073 |
| Arco c-b at 1C String #1-1550-1640 Deepest | <1 | 0.15 |
| Arco c-b at 1C String #2-1450-1480 | <1 | 0.085 |
| Arco c-b at 1C String #3-60'-1250' | <1 | 0.038 |

*Test performed on samples marked "Regular"

Charles R. Wilson
Charles R. Wilson
Analyst

M L Jacobs
Approved by:
M. L. Jacobs, Ph.D.
Divisional Manager

CRW/hb

CHICAGO, IL • CHARLESTON, WV • CLARKSBURG, WV • CLEVELAND, OH • NORFOLK, VA • TERRE HAUTE, IN • HENDERSON, KY • DENVER, CO • BIRMINGHAM, AL • VANCOUVER, B.C. CAN.

HAZEN RESEARCH, INC.
4601 Indiana Street
Golden, Colorado 80401

Mr. Frank C. Haas
The Oil Shale Corporation
18200 West Highway 72
Golden, Colorado 80401

Date: December 20, 1974
HRI Project No. 535
HRI Series No. 7583
Samples received: Nov. 8, 1974

# REPORT OF ANALYSIS

| Analysis | Sample | α | pCi/l | α | β | pCi/l | β | | | pCi/l |
|---|---|---|---|---|---|---|---|---|---|---|
| No. | Designation | Total | ± | Precision* | Total | ± | Precision* | $Ra^{226}$ | ± | Precision* |
| 7583-1 | 1-C string #1 1550-1640 | 4.0 | ± | 2.1 | 41 | ± | 10 | | | |
| -2 | 1-C string #2 1450-1480 | 1.6 | ± | 1.7 | 0 | ± | 9 | | | |
| -3 | 1-C string #3 60-1250 | 2.0 | ± | 1.7 | 2 | ± | 9 | | | |
| -4 | SG-11 11/2 | 43 | ± | 40 | 390 | ± | 170 | 27 | ± | 5 |
| -5 | SG-18 11/1 | 3.6 | ± | 2.3 | 0 | ± | 11 | | | |
| -6 ✓ | SG-19 11/1 | 7.9 | ± | 4.4 | 33 | ± | 19 | 0.1 | ± | 0.7 |

*Variability of the radioactive disintegration process (counting error) at the 95% confidence level, 1.96σ

By:
John C. Jarvis
Manager, Analytical Laboratory

ljb

Water Quality - Pump Tests

## II B-6 WATER QUALITY ANALYSES
## AQUIFER PUMP TESTS

Table II B-6.1 lists results of the analyses of three samples from the aquifer pump test well, AT-1. The first sample was collected at the end of a 4-hour pumping period on September 15, 1974 when the generator, transformers and pump were installed and tested. The second sample was collected after a preliminary pumping test of 15 hours. The third sample was taken after 23 days of pumping.

Major constituent analyses were done by Industrial Laboratories, Denver, Colorado; trace metals and total organic carbon by Commercial Testing & Engineering, Golden, Colorado; and radioactivity by Hazen Research, Inc., Golden, Colorado.

Total organic carbon was less than 1 mg/l. Gross beta was less than 100 pC/l. Gross alpha was greater than 4 pC/l; therefore, $Ra_{226}$ was determined and was found to be less than 4 pC/l.

The major change observed during the testing was in the sulfate content, which changed markedly from well over 200 mg/l initially, to less than 4 mg/l on into the test. This probably reflects the initial contribution of high sulfate water from the Evacuation Creek Member versus the low sulfate-high bicarbonate water from the Parachute Creek Member. A logical hypothesis would be that as water levels in the pumping well dropped, fractures in the Evacuation Creek Member were depleted and the sulfate content was diminished. Another change observed during the testing was in the fluoride content, which increased as testing progressed from initial levels of 2-4 mg/l to about 18 mg/l. Perhaps this reflects early dilution by very low fluoride content water in the uppermost level of the aquifer which was depleted as pumping continued and water levels dropped.

## TABLE II B-6.1

## WATER QUALITY ANALYSIS
## AQUIFER PUMP TESTS

Well Number: AT-1

| Date | | 9/15/74 | 10/22/74 | 12/23/74 | | |
|---|---|---|---|---|---|---|
| | Element Measured | | (15 hours) | | | |
| 1. | Aluminum (ug/l) | | .04 | | | |
| 2. | Ammonia (mg/l) | | 0.8 | | | |
| 3. | Arsenic (ug/l) | | .02 | | | |
| 4 | Barium (ug/l) | | .01 | | | |
| 5. | Beryllium (ug/l) | | | | | |
| 6. | Bicarbonate (mg/l) | 435 | 420 | 570 | | |
| 7. | Bismuth (ug/l) | | <.005 | | | |
| 8. | Boron (ug/l) | | 0.7 | 1.5 | | |
| 9. | Cadmium (ug/l) | | <.005 | | | |
| 10. | Calcium (mg/l) | 40 | 61 | 16 | | |
| 11. | Carbonate (mg/l) | | 24 | <.1 | | |
| 12. | Cerium (mg/l) | | <.005 | | | |
| 13. | Chloride (mg/l) | 3 | 7 | 7 | | |
| 14. | Chrome, Hexavalent | | <.01 | | | |
| 15. | Cobalt (ug/l) | | .001 | | | |
| 16. | Conductivity, Specific (u℧) | 1050 | 990 | | | |
| 17. | Copper (ug/l) | | .02 | | | |
| 18. | Fluoride (mg/l) | 2.7 | 4.8 | 18 | | |
| 19. | Gallium (ug/l) | | <.005 | | | |
| 20. | Hardness, Total | | 180 | | | |
| 21. | Hydroxide (mg/l) | | <.1 | | | |
| 22. | Iron (ug/l) | | .4 | | | |
| 23. | Lead (ug/l) | | .01 | | | |
| 24. | Lithium (ug/l) | | .08 | | | |
| 25. | Magnesium (mg/l) | 34 | 7.9 | 9.5 | | |
| 26. | Manganese (ug/l) | | .01 | | | |
| 27. | Mercury (ug/l) | | .0085 | | | |
| 28. | Molybdenum (ug/l) | | .005 | | | |
| 29. | Nickel (ug/l) | | .01 | | | |
| 30. | Nitrate (mg/l) | | 1.0 | | | |
| 31. | pH | 8.2 | 8.4 | | | |
| 32. | Phosphate, Total | | <.1 | | | |
| 33. | Potassium (mg/l) | | | <1 | | |
| 34. | Selenium (ug/l) | | <.005 | | | |
| 35. | Silica (mg/l) | 19 | 18 | | | |
| (*)36. | Silver (ug/l) | | <.005 | | | |
| 37. | Sodium (mg/l) | 194 | 210 | 200 | | |
| 38. | Solids, Dissolved (mg/l) | 767 | 740 | 560 | | |
| 39. | Strontium (ug/l) | | 1 | | | |
| 40. | Sulfate (mg/l) | 261 | 210 | <4 | | |
| 41. | Titanium (ug/l) | | .1 | | | |
| 42. | Vanadium (ug/l) | | .001 | | | |
| 43. | Yttrium (mg/l) | | <.005 | | | |
| 44. | Zinc (ug/l) | | <.5 | | | |
| 45. | Zirconium (mg/l) | | <.005 | | | |
| 46. | Radioactivity | | | | | |
| | Gross Alpha (pcl) | | 4.2 | | | |
| | Radium 226* | | .3 | | | |
| | Gross Beta (pcl) | | 0 | | | |
| | Thorium 230** | | | | | |
| | Uranium** | | | | | |
| 47. | Total Organic Carbon (TOC) | | | | | |
| | If TOC > 10 mgl/l then measure | | | | | |
| | Dissolved Organic Carbon | | <1 | | | |
| | Suspended Organic Carbon | | | | | |
| | Phenols | | | | | |
| | Sulfur, Acid Extract | | | | | |
| | Nitrogen, Base Extract | | | | | |

(*) Not required

* Required if gross alpha is greater than 4 picocuries per liter (pcl).

** Required if gross beta is greater than 100 picocuries per liter (pcl).

NEW YORK ☐
DENVER ☒
LOS ANGELES ☐

THE OIL SHALE CORPORATION
INTER OFFICE MEMORANDUM

LABORATORY DATA LETTER 75-12

FROM: F. C. Haas
TO: File

DATE: January 15, 1975
FILE NO.: 5100-3
SUBJECT: Analysis of Water Sample from Aquifer Test No. 1 After Pumping Fifteen Hours

Project No. 197

Attached are results of the water analysis of a sample taken from the Aquifer Test No. 1 after pumping for 15 hours. Major constituent analyses were done by Industrial Laboratories, Denver, Colorado; trace metals and total organic carbon by Commercial Testing & Engineering, Golden, Colorado, and radioactivity by Hazen Research, Inc., Golden, Colorado.

Total organic carbon was less than 1 mg/l. Gross beta was less than 100 pCi/l. Gross alpha was greater than 4 pCi/l, therefore, $Ra_{226}$ was determined, but was found to be less than 4 pCi/l. These values are below drinking water standards.

FCH/aw
Encs.

Approved (MTA)

cc: B. L. Schulman
J. H. Barney
R. G. Vawter
H. M. Spence
T. H. Cleveland
A. W. Schillinger
M. W. Legatski (ARCO)
J. R. Matis (ARCO)/
D. B. Tait (ARCO)

THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211
TELEPHONE 455-3641

ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY
John Matis

DATE RECEIVED: 11/1/74
DATE REPORTED: 12/9/74

LAB. NUMBER: 4321

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

AMPLE MARKED: #1 Test - 15 Hours Test

ANALYSIS:

| | MILLIGRAMS PER LITER | MILLI-EQUIVALENTS |
|---|---|---|
| Calcium | 61 | 3.044 |
| Magnesium | 7.9 | 0.650 |
| Sodium | 210 | 9.135 |
| Carbonate | 24 | 0.799 |
| Bicarbonate | 420 | 6.888 |
| Chloride | 7 | 0.197 |
| Sulfate | 210 | 4.368 |
| Nitrate | 1.0 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 18 | 0.599 |
| Iron | Less than 0.05 | --- |
| Fluoride | 4.8 | 0.126 |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | | |
| Hardness, in terms of calcium carbonate | 180 | |
| Total dissolved solids (calculated) | 740 | |
| Kjeldahl nitrogen | 1.1 | |
| Ammonia-nitrogen | 0.8 | |
| Lithium | Less than 0.05 | |
| Barium | Less than 1.0 | |
| Hexavalent chromium | Less than 0.01 | |
| Arsenic | Less than 0.01 | |
| Selenium | Less than 0.01 | |
| Boron | 0.7 | |
| Hydroxide | Less than 0.1 | |

Σ Cations = 12.83
Σ Anions = 12.38
% Difference = 1.8

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | Less than 0.1 |
| Copper | Less than 0.1 |
| Cadmium | Less than 0.01 |
| Lead | 0.12 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.01 |
| Zinc | Less than 0.5 |
| Mercury | Less than 0.01 |

pH 8.4
Specific conductance 990 micromhos per cc

THE INDUSTRIAL LABORATORIES COMPANY

CHEMIST

EMBERS OF:

AMERICAN ASS'N OF CEREAL CHEMISTS
AMERICAN CHEMICAL SOCIETY
AMERICAN OIL CHEMISTS' SOCIETY
ASS'N OF OFFICIAL RACING CHEMISTS
BAKERY ENGINEERS OF AMERICA
INSTITUTE OF FOOD TECHNOLOGY
SIGMA XI

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434
Reply to INSTRUMENTAL ANALYSIS DIVISION, 14335 WEST AVENUE, GOLDEN, COLORADO, 80401, PHONE: 303-278-9521

To: Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, Colo. 80401

Date: 20 November 74

Analyst: S. Sweeney

P. O. No.:

Sample No.: Aquifer Test #1 after pumping 15 hrs JAD No.: 97-153-002-04

CONCENTRATION IN ~~PPM WEIGHT~~ $\mu$g/ml

| ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. | ELEMENT | CONC. |
|---|---|---|---|---|---|---|---|
| Uranium | | Terbium | | Ruthenium | | Vanadium | 0.001 |
| Thorium | | Gadolinium | | Molybdenum | 0.005 | Titanium | 0.1 |
| Bismuth | | Europium | | Niobium | | Scandium | <0.001 |
| Lead | 0.01 | Samarium | | Zirconium | | Calcium | * |
| Thallium | | Neodymium | | Yttrium | | Potassium | * |
| Mercury | **0.0085 | Praseodymium | | Strontium | 1 | Chlorine | * |
| Gold | | Cerium | | Rubidium | 0.002 | Sulfur | * |
| Platinum | | Lanthanum | | Bromine | 0.003 | Phosphorus | 0.2 |
| Iridium | | Barium | 0.01 | Selenium | | Silicon | * |
| Osmium | | Cesium | | Arsenic | 0.02 | Aluminum | 0.04 |
| Rhenium | | Iodine | | Germanium | | Magnesium | * |
| Tungsten | | Tellurium | | Gallium | | Sodium | * |
| Tantalum | | Antimony | | Zinc | 0.05 | Fluorine | * |
| Hafnium | | Tin | | Copper | 0.02 | Oxygen | NR |
| Lutetium | | Indium | STD | Nickel | 0.01 | Nitrogen | NR |
| Ytterbium | | Cadmium | | Cobalt | 0.001 | Carbon | NR |
| Thulium | | Silver | | Iron | 0.4 | Boron | 0.02 |
| Erbium | | Palladium | | Manganese | 0.01 | Beryllium | |
| Holmium | | Rhodium | | Chromium | 0.004 | Lithium | 0.08 |
| Dysprosium | | | | | | Hydrogen | NR |

NR — Not Reported
All elements not reported <0.005 $\mu$g/ml
*Not reported upon request
**Flameless Atomic Absorption

Approved:

CABLE ADDRESS COM

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434

SINCE 1908

Reply to
Instrumental Analysis Division
14335 West 44th Avenue
Golden, Colorado 80401

Phone: 303-278-9521

20 November 74

Mr. Frank Haas
The Oil Shale Corporation
18200 West Hiway 72
Golden, CO 80401

Re: IAD #97-153-002-04

ANALYTICAL REPORT

| | TOC*<br>mg/liter | Nitrates**<br>mg/liter N |
|---|---|---|
| ✓ Aquifer Test #1 after pumping 15 hrs. | <1 | 0.34 |
| Well 1-C String #2 | 8 | 0.10 |
| ARCO SG #18-A T.D. 1330' | <1 | 0.22 |
| ARCO SG-9 2750' | <1 | 0.056 |

*Test performed on samples marked "Regular" and run by an outside laboratory.

**Test performed on samples marked "Hg for N"

Charles R. Wilson
Charles R. Wilson
Analyst

M L Jacobs
Approved by:
M. L. Jacobs Ph.D.
Divisional Manager

CRW/hb

AMERICAN COUNCIL OF INDEPENDENT LABORATORIES

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HAZEN RESEARCH, INC.
4601 Indiana Street
Golden, Colorado 80401

Mr. F. C. Haas
The Oil Shale Corporation
18200 West Highway 72
Golden, Colorado 80401

Date: December 3, 1974
HRI Project No. 535
HRI Series No. 7559
Samples received: November 1, 1974

## REPORT OF ANALYSIS

| Analysis No. | Sample Designation | α Total | pCi/1 ± | α Precision* | β Total | pCi/1 ± | β Precision* | $Ra^{226}$ | pCi/1 ± | Precision* |
|---|---|---|---|---|---|---|---|---|---|---|
| 7559-1 ✓ | Aquifer Test #1 Pumped 15 hrs. | 4.2 | ± | 2.3 | 0 | ± | 11 | 0.3 | ± | 0.5 |
| -2 | Well #1-C String #2 | 0.6 | ± | 3.4 | 9 | ± | 12 | | | |
| -3 | SG-9 2750' | 5.5 | ± | 2.6 | 0 | ± | 11 | 0 | ± | 0.4 |
| -4 | SG-18-A TD 1380 | 8.0 | ± | 3.3 | 0 | ± | 11 | 0.1 | ± | 0.4 |

By: 
John C. Jarvis
Manager, Analytical Laboratory

ljb

*Variability of the radioactive disintegration process (counting error) at the 95% confidence level, 1.96σ

RECEIVED
DEC 4 1974
TOSCO-GOLDEN

THE INDUSTRIAL LABORATORIES COMPANY

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211
TELEPHONE 455-3641

ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY
John Matis

DATE RECEIVED: 11/1/74
DATE REPORTED: 12/9/74

LAB. NUMBER: 4321

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

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ANALYSIS:

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|---|---|---|
| Calcium | 61 | 3.044 |
| Magnesium | 7.9 | 0.650 |
| Sodium | 210 | 9.135 |
| Carbonate | 24 | 0.799 |
| Bicarbonate | 420 | 6.888 |
| Chloride | 7 | 0.197 |
| Sulfate | 210 | 4.368 |
| Nitrate | 1.0 | --- |
| Phosphate | Less than 0.1 | --- |
| Silicon dioxide | 18 | 0.599 |
| Iron | Less than 0.05 | --- |
| Fluoride | 4.8 | 0.126 |
| P. alkalinity, in terms of calcium carbonate | --- | |
| MO alkalinity, in terms of calcium carbonate | --- | |
| Hardness, in terms of calcium carbonate | 180 | |
| Total dissolved solids (calculated) | 740 | |
| Kjeldahl nitrogen | 1.1 | |
| Ammonia-nitrogen | 0.8 | |
| Lithium | Less than 0.05 | |
| Barium | Less than 1.0 | |
| Hexavalent chromium | Less than 0.01 | |
| Arsenic | Less than 0.01 | |
| Selenium | Less than 0.01 | |
| Boron | 0.7 | |
| Hydroxide | Less than 0.1 | |

| | MILLIGRAMS PER LITER |
|---|---|
| Aluminum | Less than 0.1 |
| Copper | Less than 0.1 |
| Cadmium | Less than 0.01 |
| Lead | 0.12 |
| Manganese | Less than 0.05 |
| Silver | Less than 0.01 |
| Zinc | Less than 0.5 |
| Mercury | Less than 0.01 |

pH 8.4
Specific conductance 990 micromhos per cc

THE INDUSTRIAL LABORATORIES COMPANY
H. Paul
CHEMIST

MEMBERS OF:
AMERICAN ASS'N OF CEREAL CHEMISTS
AMERICAN CHEMICAL SOCIETY
AMERICAN OIL CHEMISTS' SOCIETY
ASS'N OF OFFICIAL RACING CHEMISTS
BAKERY ENGINEERS OF AMERICA
INSTITUTE OF FOOD TECHNOLOGY
SIGMA XI

...IS REPORT IS NOT TO BE REPRODUCED IN WHOLE OR IN PART FOR ADVERTISING PURPOSES WITHOUT OBTAINING PRIOR WRITTEN AUTHORIZATION

**THE INDUSTRIAL LABORATORIES COMPANY**

*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211
TELEPHONE 455-3641

ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY

DATE RECEIVED: 1/6/75
DATE REPORTED: 1/15/75

LAB. NUMBER: 5943

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

SAMPLE MARKED: Water

| ANALYSIS: | SG 1<br>12/6<br>2,525' | SG 1<br>Para-chute | AT 1<br>12/23<br>9 AM | SG 17<br>1280-1309'<br>11/3 |
|---|---|---|---|---|
| Calcium | 20 | 16 | 16 | 7.4 |
| Magnesium | 13 | 11 | 9.5 | 5.3 |
| Sodium | 550 | 610 | 200 | 280 |
| Potassium | Less than 1 | Less than 1 | Less than 1 | Less than 1 |
| Carbonate | Less than 0.1 | Less than 0.1 | Less than 0.1 | Less than 0.1 |
| Bicarbonate | 1,280 | 1,330 | 570 | 700 |
| Chloride | 43 | 56 | 7.0 | 9.7 |
| Fluoride | 14 | 14 | 13 | 18 |
| Sulfate | 150 | 205 | Less than 4 | Less than 4 |
| Boron | 2.0 | 1.9 | 18.1 | 1.8 |
| Silicon dioxide | 13 | 13 | 16 | 12 |

Figures are milligrams per liter

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SIGMA XI

cc: Tosco

II B-211

THE INDUSTRIAL LABORATORIES COMPANY

CHEMIST

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THE INDUSTRIAL LABORATORIES COMPANY
*Analytical and Consulting Chemists*
2600 WEST 29TH AVENUE
DENVER, COLORADO 80211
TELEPHONE 455-3641

ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY
2 Park Central, Suite 555
1515 Arapahoe Street
Denver, Colorado 80202

Attn: JOhn Matis

DATE RECEIVED: 1/6/75
DATE REPORTED: 1/17/75

LAB. NUMBER: 5943

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ETC.) IN ADVANCE.

SAMPLE MARKED: Water

ANALYSIS:

| | SG 1<br>12/6<br>2,525' | SG 1<br>Para-<br>chute | AT 1<br>12/23<br>9 AM | SG 17<br>1280-1309'<br>11/3 |
|---|---|---|---|---|
| Calcium | 0.988 | 0.798 | 0.798 | 0.369 |
| Magnesium | 1.070 | 0.905 | 0.782 | 0.436 |
| Sodium | 23.925 | 26.535 | 8.700 | 12.180 |
| Bicarbonate | 20.992 | 21.812 | 9.348 | 11.480 |
| Chloride | 1.213 | 1.580 | --- | 0.274 |
| Sulfate | 3.120 | 4.264 | --- | --- |
| Silicon dioxide | 0.433 | 0.433 | 0.533 | 0.400 |

| | SG 17<br>DST 18<br>1,374' | SG 17 12/12<br>DST 28<br>1,514-1,572' | SG 17<br>DST 21 12/10<br>1,473-1,522' | SG 17 12/14<br>DST 24<br>1,561-1.622' |
|---|---|---|---|---|
| CAlcium | 0.284 | 0.205 | 0.205 | 0.245 |
| Magnesium | 0.370 | 0.403 | 0.304 | 0.658 |
| Sodium | 11.310 | 13.050 | 10.875 | 14.138 |
| Bicarbonate | 10.988 | 12.136 | 10.332 | 13.612 |
| Chloride | --- | 0.367 | --- | 0.395 |
| Fluoride | 0.999 | 1.052 | 1.052 | 1.052 |
| Sulfate | --- | --- | --- | --- |
| Silicon dioxide | 0.533 | 0.566 | 0.533 | 0.566 |

Figures are milli-equivalents

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*Analytical and Consulting Chemists*

2600 WEST 29TH AVENUE
DENVER, COLORADO 80211

TELEPHONE 455-3641

## ANALYSIS REPORT

ATLANTIC RICHFIELD COMPANY
2 Park Central, Suite 555
1515 Arapahoe Street
Denver, Colorado 80202
Attn: John Matis

**DATE RECEIVED:** 1/6/75
**DATE REPORTED:** 3/10/75

**LAB. NUMBER:** 5943

RE-TEST

SAMPLES ARE DISCARDED IN 15 DAYS FROM DATE OF REPORT UNLESS WE ARE REQUESTED, IN WRITING, TO RETAIN THEM FOR A LONGER PERIOD. PERISHABLE SAMPLES ARE USUALLY DISCARDED IMMEDIATELY UNLESS CLIENT HAS REQUESTED SPECIAL HANDLING (FREEZING, ECT.) IN ADVANCE.

**SAMPLE MARKED:** AT 1 12/23 9 AM

**ANALYSIS:**

| | | | | |
|---|---|---|---|---|
| Boron (retest) | 1.5 | milligrams | per | liter |
| Fluoride (retest) | 18 | " | " | " |
| Sulfate (retest) | Less than 4.0 | " | " | " |
| Total dissolved solids (calculated) | 550 | " | " | " |

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SIGMA XI

THE INDUSTRIAL LABORATORIES COMPANY
H. Paul Ochs
CHEMIST

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# AT-1 PRELIMINARY 4 HOUR PUMP TEST

## SEPTEMBER 15, 1974

### TOSCO LAB DATA

| | |
|---|---|
| Na | 194 |
| Ca | 40 |
| Mg | 34 |
| $SO_4$ | 261 |
| $HCO_3$ | 435 |
| Cl | 3 |
| F | 2.7 |
| Si | 19 |
| pH | 8.2 |
| Spec. cond. | 1050 mmhos |
| TDS | 767 |

NOTE: Pumping rate 400 gallons per minute, sample collected at end of test.

Aquifer Data - Jetting Tests

## II B-7 AQUIFER DATA
## JETTING TESTS

A description of jetting test procedures and calculation methods was presented in Quarterly Report #1. During the second report period, jetting tests were run on wells SG-1, SG-17, SG-20 and SG-21 (Table II B-7.1).

TABLE II B-7.1

JETTING TEST DATA

| WELL | TEST NO. | DATE | DEPTH | TRANSMISSIVITY, T; gal/day/ft. |
|---|---|---|---|---|
| SG-1 | JT-1 | 11- 4-74 | 450 | 4570 |
| | JT-2 | 11- 7-74 | 706 | 4075 |
| | JT-3 | 11-12-74 | 1036 | 3880 |
| | JT-4 | 11-14-74 | 1105 | 4440 |
| | JT-5 | 12- 1-74 | 2227 | 5160 |
| | JT-6 | 12- 6-74 | 2525 | 4620 |
| SG-17 | JT-1 | 11-10-74 | 859 | 113 |
| | JT-2 | 11-27-74 | 1250 | 916 |
| | JT-3 | 12- 1-74 | 1336 | 1374 |
| SG-20 | JT-1 | 12- 4-74 | 515 | 7.5 |
| | JT-2 | 12-12-74 | 986 | 9350 |
| SG-21 | JT-1 | 12-16-74 | 576 | 9.5 |

# WELL SG-1

# JETTING TEST DATA

ARCO, ET AL @613'

PUMP TEST DATA SHEET ; WELL NO. 56 #1

TEST WITH OPEN DRILL COLLARS, NO BIT OR BARREL

PUMPED WELL ______ OBSERVATION WELL ______

Drill pipe to 450'

DATE: 11-4-74 STATIC WATER LEVEL ______

PUMP (ON) ~~(OFF)~~ AT 21:00 (DRAWDOWN) (RECOVERY) TEST
OFF 23:00

WATER TEMP. ✓ CONDUCTIVITY ✓ SAMPLE TAKEN [✓ YES] (NO)

MP = MEASURING POINT MP 8.1 FT. ABOVE G.L. (GROUND LEVEL)

| CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | | | PUMP RATE | CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | t/t' | PUMP RATE |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | Temp | COND | | FLUME | | 12 | 129.7 | 11 | |
| | 10 | 13.5 | 950 | | .81 | | 14 | 127.7 | 9.6 | |
| | 20 | | 1000 | | .82 | | 16 | 125.3 | 8.5 | |
| | 30 | | | | .82 | | 18 | 124.4 | 7.6 | |
| | 40 | | | | .81 | | 20 | 122.9 | 7.0 | |
| | 50 | | | | .80 | | 25 | 120.3 | 5.8 | |
| | 60 | | | | .79 | | 30 | 117.7 | 5.0 | |
| | 70 | | | | .78 | | 35 | 116.0 | 4.4 | |
| | 80 | | | | .77 | | 40 | 114.2 | 4.0 | |
| | 90 | | | | | | 45 | 113.0 | 3.6 | |
| | 100 | | | | | | 50 | 111.9 | 3.4 | |
| | 110 | | | | | | 60 | 110.0 | 3.0 | |
| | 120 | ↓ | ↓ | | ↓ 610 5/m | | 70 | 107.9 | 2.7 | |
| | 0 | | | t/t' | | | 80 | 106.7 | 2.5 | |
| | 1 | | | | | | 90 | 105.2 | 2.3 | |
| | 2 | 152.7 | | 61 | | | 100 | 104.4 | 2.2 | |
| | 3 | 144.0 | | 41 | | | 110 | 103.4 | 2.1 | |
| | 4 | 143.5 | | 31 | | | 120 | 102.5 | 2.0 | |
| | 5 | 141.6 | | 25 | | | | | | |
| | 6 | 139.1 | | 21 | | | | | | |
| | 7 | 137.2 | | 18 | | | | | | |
| | 8 | 135.5 | | 16 | | | | | | |
| | 9 | 133.2 | | 14.3 | | | | | | |
| | 10 | 132.5 | | 13 | | | | | | |

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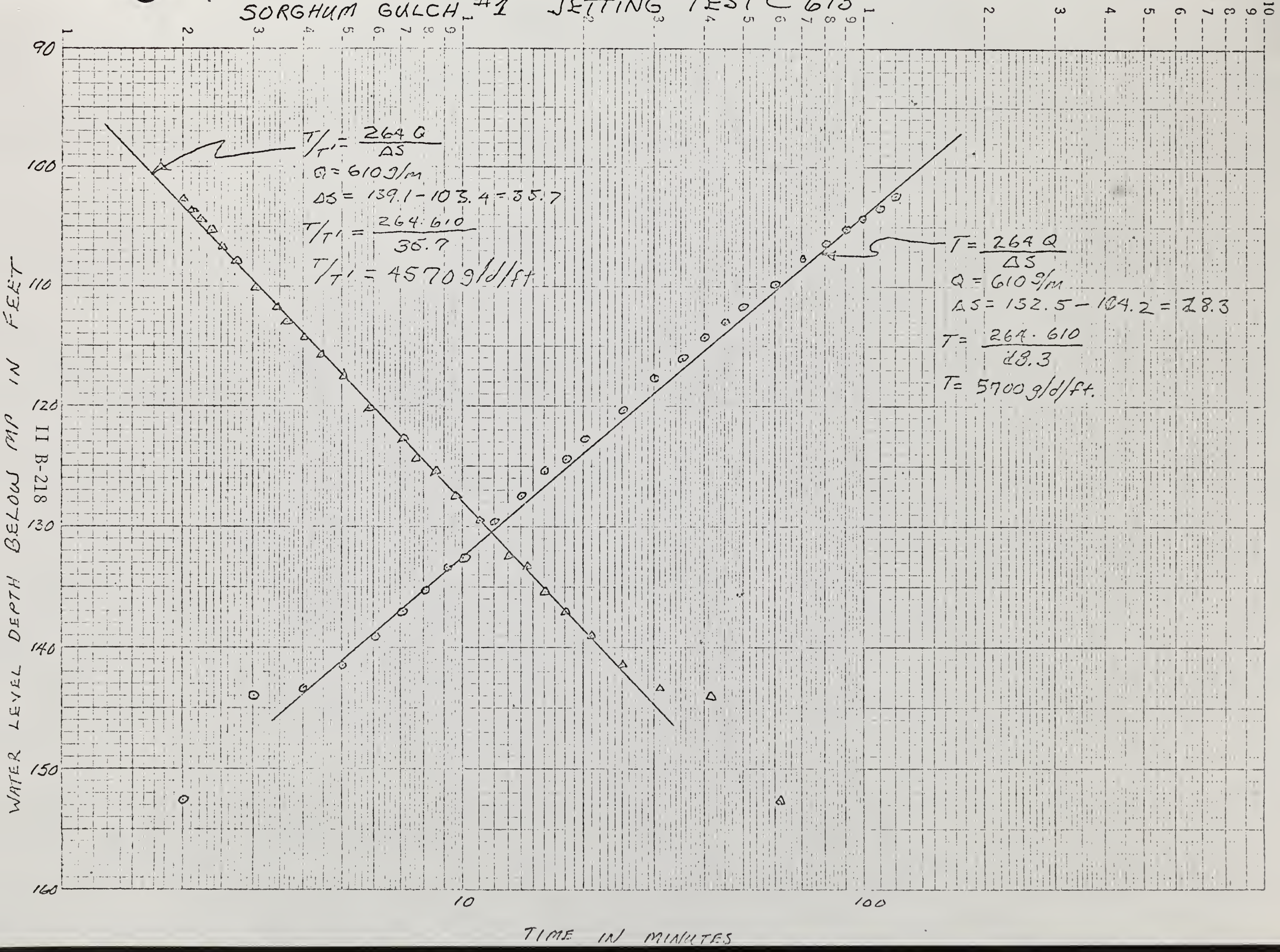
# SORGHUM GULCH #1 JETTING TEST @ 613'



$T/T' = \frac{264\,Q}{\Delta S}$

$Q = 610$ g/m

$\Delta S = 139.1 - 103.4 = 35.7$

$T/T' = \frac{264 \cdot 610}{35.7}$

$T/T' = 4570$ g/d/ft

$T = \frac{264\,Q}{\Delta S}$

$Q = 610$ g/m

$\Delta S = 132.5 - 104.2 = 28.3$

$T = \frac{264 \cdot 610}{28.3}$

$T = 5700$ g/d/ft.

ARCO, Et AL    TOP PARACHUTE CR. @706'

**PUMP TEST DATA SHEET ; WELL NO.** SG#1

OPEN ENDED COLLARS

PUMPED WELL ______________ OBSERVATION WELL ______________

DATE: 11-7-74    STATIC WATER LEVEL 100'

PUMP (ON) (~~OFF~~) AT 4:00 6:00    (DRAWDOWN) (RECOVERY) TEST

WATER TEMP. ✓   CONDUCTIVITY ✓   SAMPLE TAKEN (✓ YES) (NO)

MP = MEASURING POINT    MP 8.1 FT. ABOVE G.L.(GROUND LEVEL)

| CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | | | PUMP RATE | CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | T/T' | PUMP RATE |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | TEMP | COND. | | FLUME | | 12 | 137.0 | 11 | |
| | 10 | 13.0°C | 1000 | | .80 | | 14 | 134.9 | 9.6 | |
| | 20 | 14.0°C | 950 | | .78 | | 16 | 133.2 | 8.5 | |
| | 30 | | | | .76 | | 18 | 131.5 | 7.6 | |
| | 40 | | | | .75 | | 20 | 130.1 | 7.0 | |
| | 50 | | | | .75 | | 25 | 127.2 | 5.8 | |
| | 60 | | | | .74 | | 30 | 125.0 | 5.0 | |
| | 70 | | | | .74 | | 35 | 123.0 | 4.4 | |
| | 80 | | | | .73 | | 40 | 121.4 | 4.0 | |
| | 90 | | | | .72 | | 45 | 120.0 | 3.6 | |
| | 100 | | | | .73 | | 50 | 119.0 | 3.4 | |
| | 110 | | | | .73 | | 60 | 116.9 | 3.0 | |
| | 120 | ↓ | ↓ | | .73 563 g/m | | 70 | 115.2 | 2.7 | |
| | 0 | | | T/T' | | | 80 | 113.8 | 2.5 | |
| | 1 | | | | | | 90 | 112.6 | 2.3 | |
| | 2 | | | | | | 100 | 111.4 | 2.2 | |
| | 3 | 158.3 | | 41 | | | 110 | 110.5 | 2.1 | |
| | 4 | 153.1 | | 31 | | | 120 | 109.6 | 2.0 | |
| | 5 | 149.7 | | 25 | | | | | | |
| | 6 | 147.1 | | 21 | | | | | | |
| | 7 | 144.9 | | 18 | | | | | | |
| | 8 | 142.8 | | 16 | | | | | | |
| | 9 | 141.1 | | 14.3 | | | | | | |
| | 10 | 139.5 | | 13 | | | | | | |

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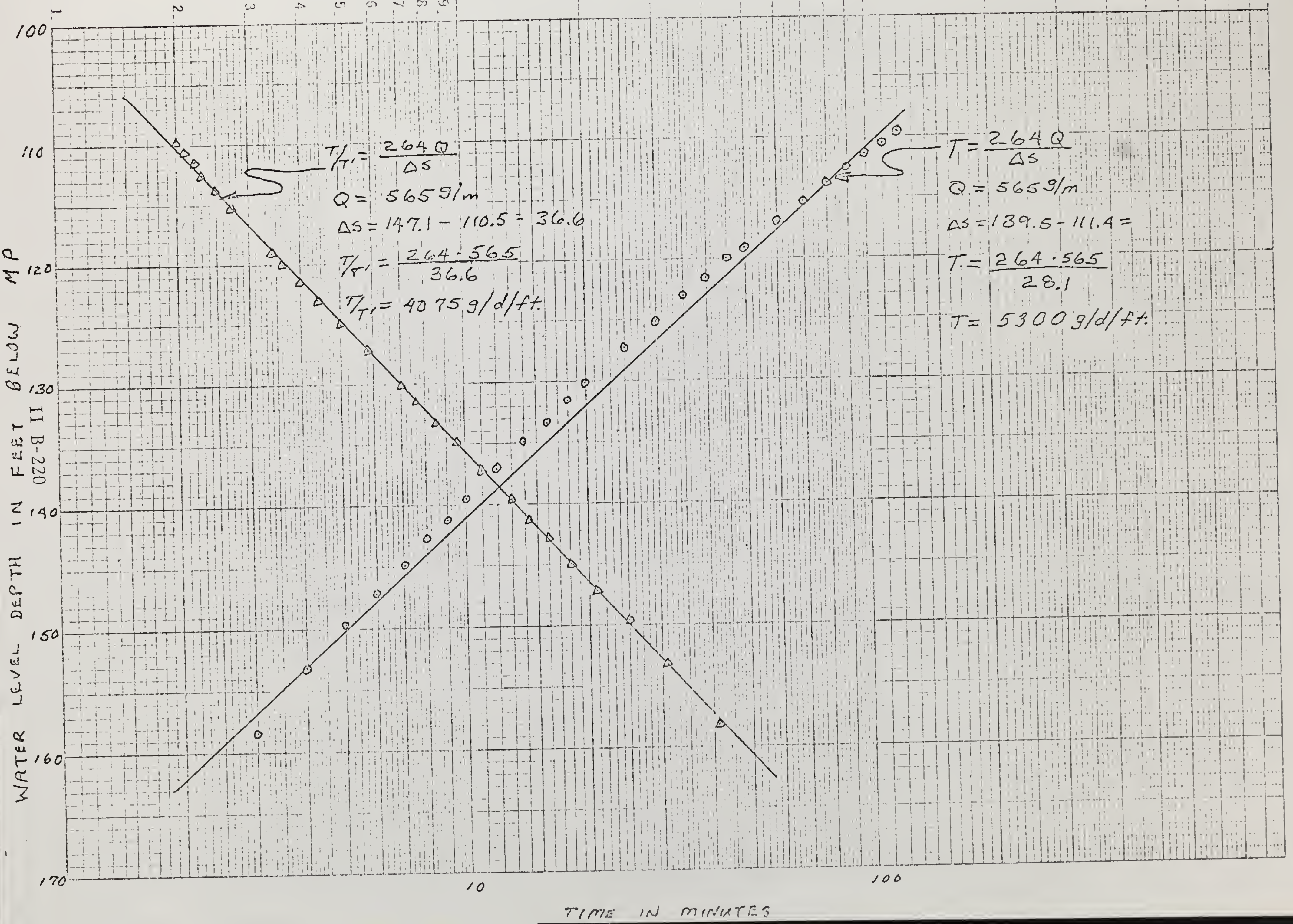
# SORGHUM GULCH #1, JETTING TEST@ 706' TOP PARACHUTE CREEK



$T/T' = \frac{264\,Q}{\Delta s}$

$Q = 565\ g/m$

$\Delta s = 147.1 - 110.5 = 36.6$

$T/T' = \frac{264 \cdot 565}{36.6}$

$T/T' = 4075\ g/d/ft.$

$T = \frac{264\,Q}{\Delta s}$

$Q = 565\ g/m$

$\Delta s = 139.5 - 111.4 =$

$T = \frac{264 \cdot 565}{28.1}$

$T = 5300\ g/d/ft.$

ARCO, ET AL.

# PUMP TEST DATA SHEET ; WELL NO. 56 #1

431' OPEN ENDED COLLARS; T.D.=1036.'

PUMPED WELL ________ OBSERVATION WELL ________

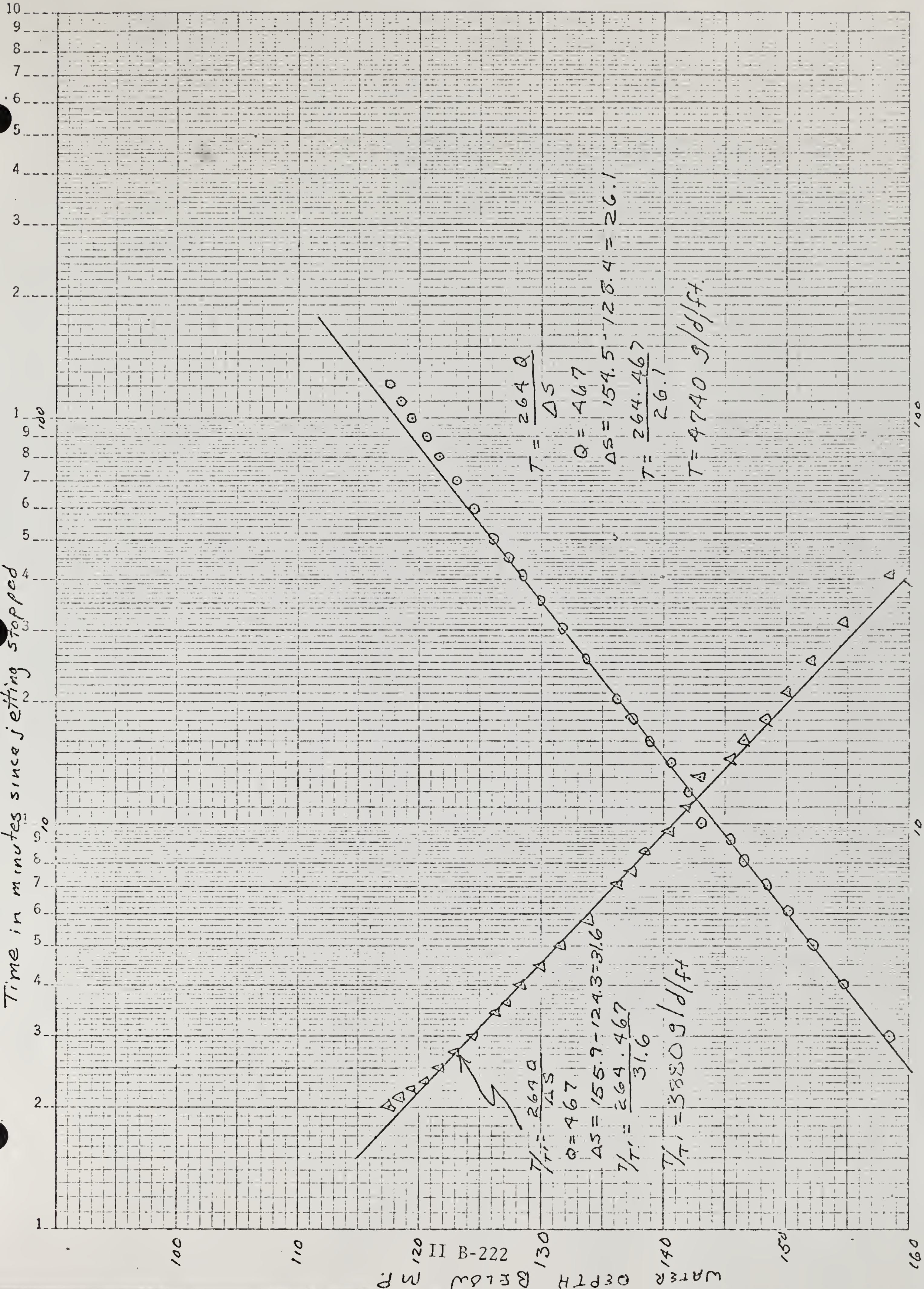
DATE: 11-12-74 STATIC WATER LEVEL ________

PUMP (ON) (~~OFF~~) AT 1330 (DRAWDOWN) [✓ (RECOVERY)] TEST
OFF 1530

WATER TEMP. ✓ CONDUCTIVITY ✓ SAMPLE TAKEN [✓ (YES)] (NO)

MP = MEASURING POINT MP 9.4' FT. ABOVE G.L.(GROUND LEVEL)

| CLOCK TIME | TIME IN MIN. | ~~WATER LEVEL DEPTH BELOW MP~~ | | | PUMP RATE | CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | T/T' | PUMP RATE |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | TEMP. | COND. | | FLUME | | 12 | 142.0 | 11 | |
| | 10 | 14.5 | 1100 | | .86 | | 14 | 140.5 | 9.6 | |
| | 20 | 14.5 | 1050 | | .86 | | 16 | 138.8 | 8.5 | |
| | 30 | 14.5 | 1000 | | .84 | | 18 | 137.4 | 7.6 | |
| | 40 | 14.5 | | | .83 | | 20 | 136.1 | 7.0 | |
| | 50 | 14.0 | | | .71 | | 25 | 133.7 | 5.8 | |
| | 60 | 14.0 | | | .66 | | 30 | 131.8 | 5.0 | |
| | 70 | 14.5 | | | .65 | | 35 | 130.0 | 4.4 | |
| | 80 | | | | .66 | | 40 | 128.5 | 4.0 | |
| | 90 | | | | .66 | | 45 | 127.2 | 3.6 | |
| | 100 | | | | .65 | | 50 | 126.2 | 3.4 | |
| | 110 | | | | .65 | | 60 | 124.4 | 3.0 | |
| | 120 | ↓ | ↓ | | .65=467 g/m | | 70 | 123.0 | 2.7 | |
| | | WATER LEVEL DEPTH BELOW MP | | T/T' | | | 80 | 121.5 | 2.5 | |
| | 0 | | | | | | 90 | 120.4 | 2.3 | |
| | 1 | | | | | | 100 | 119.3 | 2.2 | |
| | 2 | | | | | | 110 | 118.3 | 2.1 | |
| | 3 | 158.3 | | 41 | | | 120 | 117.5 | 2.0 | |
| | 4 | 154.7 | | 31 | | | | | | |
| | 5 | 152.1 | | 25 | | | | | | |
| | 6 | 150.1 | | 21 | | | | | | |
| | 7 | 148.2 | | 18 | | | | | | |
| | 8 | 146.6 | | 16 | | | | | | |
| | 9 | 145.3 | | 14.3 | | | | | | |
| | 10 | 143.0 | | 13 | | | | | | |



SG #1 JETTING TEST @ 1036.6' MINE ROOF

$T = \frac{264\,Q}{\Delta S}$

$Q = 467$

$\Delta S = 154.5 - 128.4 = 26.1$

$T = \frac{264 \cdot 467}{26.1}$

$T = 4740$ g/d/ft

$T/T' = \frac{264\,Q}{\Delta S}$

$Q = 467$

$\Delta S = 155.9 - 124.3 = 31.6$

$T/T' = \frac{264 \cdot 467}{31.6}$

$T/T' = 3880$ g/d/ft

# PUMP TEST DATA SHEET ; WELL NO. SG#1

BASE MINE ZONE @ 1105' : WITH 800' OF PIPE

PUMPED WELL ________ OBSERVATION WELL ________

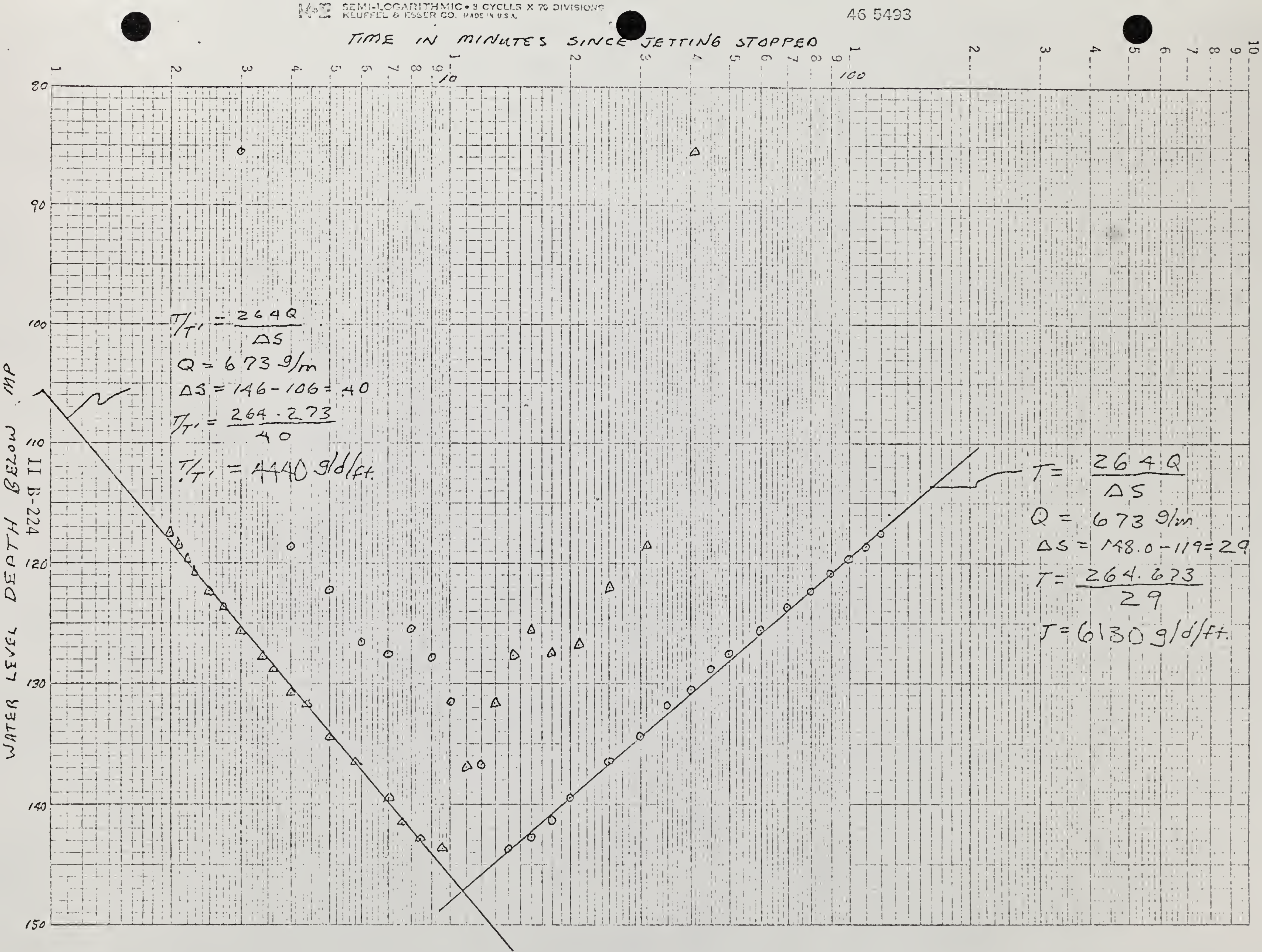
DATE: 11-14-74 STATIC WATER LEVEL ________

PUMP (ON) (~~OFF~~) AT 800 (DRAWDOWN) (RECOVERY) TEST
OFF AT 1000

WATER TEMP. ✓ CONDUCTIVITY ✓ SAMPLE TAKEN [✓ (YES)] (NO)

MP = MEASURING POINT MP ____ FT. ABOVE G.L.(GROUND LEVEL)

| CLOCK TIME | TIME IN MIN. | ~~WATER LEVEL DEPTH BELOW MP~~ | | | PUMP RATE | CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | T/T' | PUMP RATE |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | TEMP. | COND. | | FLUME | | 12 | 136.9 | 11 | |
| | 10 | 14.°C | 1050 | | .90 | | 14 | 143.7 | 9.6 | |
| | 20 | 15. | 1000 | | .90 | | 16 | 142.8 | 8.5 | |
| | 30 | 15. | ↓ | | .88 | | 18 | 141.4 | 7.6 | |
| | 40 | 15. | | | .86 | | 20 | 139.7 | 7.0 | |
| | 50 | 15. | | | .84 | | 25 | 136.5 | 5.8 | |
| | 60 | 15.5 | | | .84 | | 30 | 134.3 | 5.0 | |
| | 70 | 15.5 | | | .83 | | 35 | 131.9 | 4.4 | |
| | 80 | 15. | | | .82 | | 40 | 130.7 | 4.0 | |
| | 90 | 15. | | | ↓ | | 45 | 128.9 | 3.6 | |
| | 100 | ↓ | | | | | 50 | 127.7 | 3.4 | |
| | 110 | | | | | | 60 | 125.6 | 3.0 | |
| | 120 | ↓ | ↓ | | ↓ = | 673% | 70 | 123.7 | 2.7 | |
| | | | | | | | 80 | 122.3 | 2.5 | |
| | 0 | WATER LEVEL DEPTH BELOW MP | | T/T' | | | 90 | 120.9 | 2.3 | |
| | 1 | | | | | | 100 | 119.9 | 2.2 | |
| | 2 | | | | | | 110 | 118.7 | 2.1 | |
| | 3 | 85.4' | | 41 | | | 120 | 117.7 | 2.0 | |
| | 4 | 118.6' | | 31 | | | | | | |
| | 5 | 122.0 | | 25 | | | | | | |
| | 6 | 126.8 | | 21 | | | | | | |
| | 7 | 127.5 | | 18 | | | | | | |
| | 8 | 125.5 | | 16 | | | | | | |
| | 9 | 127.8 | | 14.3 | | | | | | |
| | 10 | 131.6 | | 13 | | | | | | |



$T/T' = \frac{264Q}{\Delta S}$

$Q = 673$ g/m

$\Delta S = 146 - 106 = 40$

$T/T' = \frac{264 \cdot 273}{40}$

$T/T' = 4440$ g/d/ft.

$T = \frac{264Q}{\Delta S}$

$Q = 673$ g/m

$\Delta S = 148.0 - 119 = 29$

$T = \frac{264 \cdot 673}{29}$

$T = 6130$ g/d/ft.

JETTING TEST @ 1105', BASE MINE ZONE SORGHUM GULCH #1

# PUMP TEST DATA SHEET ; WELL NO. SC-#1

1,000' open ended

PUMPED WELL SC-#1 OBSERVATION WELL SC-#1

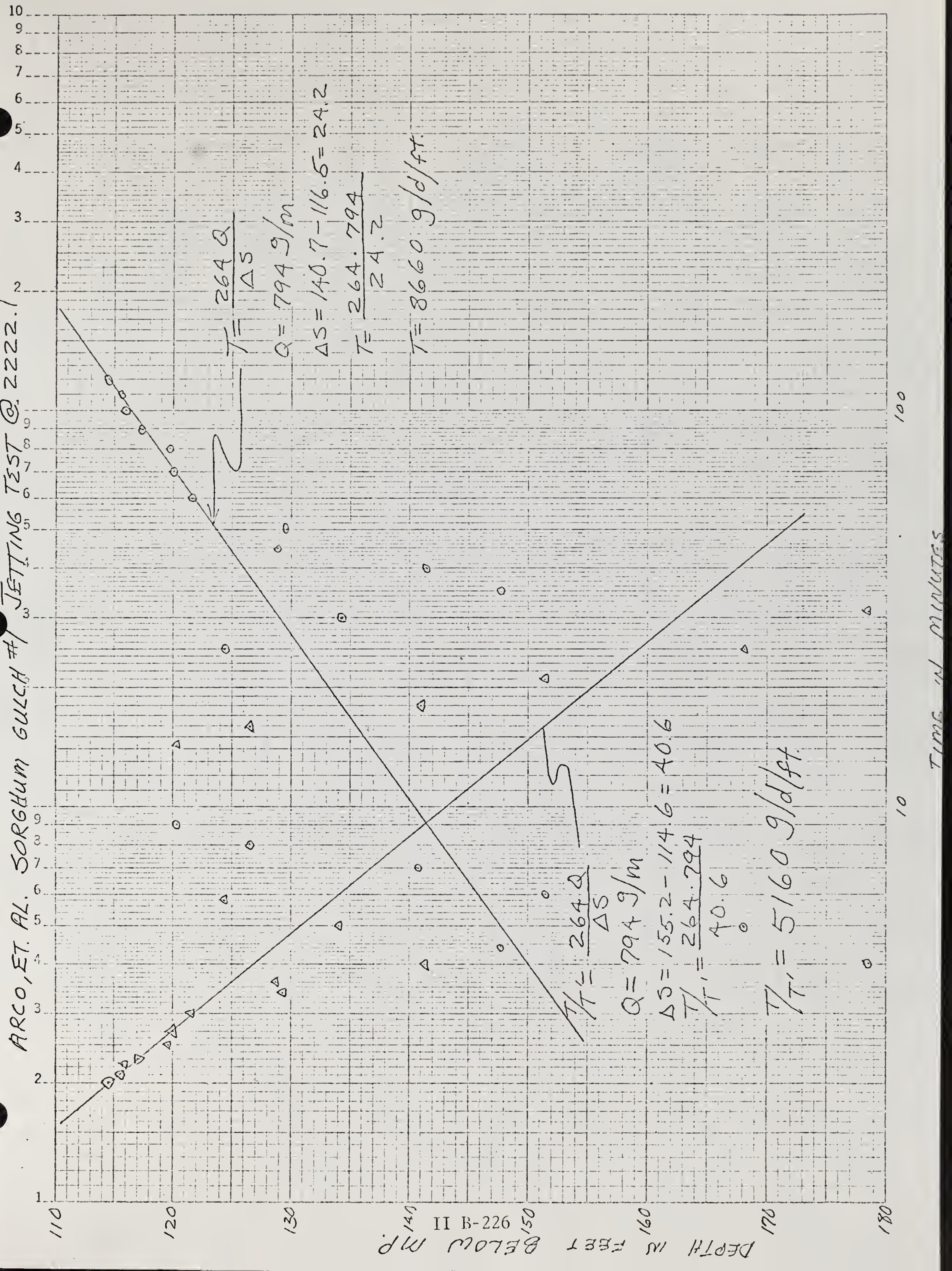
DATE: 12-1-74 STATIC WATER LEVEL ______

PUMP (ON) (OFF) AT 1945 (DRAWDOWN) (RECOVERY) TEST

WATER TEMP. ✓ CONDUCTIVITY ✓ SAMPLE TAKEN [✓ YES] (NO)

MP = MEASURING POINT MP ____ FT. ABOVE G.L. (GROUND LEVEL)

| CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH ~~BELOW MP~~ | | | ~~PUMP~~ RATE | CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | T/T' | PUMP RATE |
|---|---|---|---|---|---|---|---|---|---|---|
| 945 | 0 | Temp | Cond | | Flow | | 12 | | 11.0 | |
| | 10 | 18.0 | 1500 | | .62 | | 14 | 296.0 | 9.6 | |
| | 20 | 18.0 | 2200 | | .77 | | 16 | 99.3 | 8.5 | |
| | 30 | 18.0 | 2000 | | .85 | | 18 | 30.4 | 7.6 | |
| | 40 | 18.0 | 2000 | | .89 | | 20 | 26.8 | 7.0 | |
| | 50 | 18.0 | 2000 | | .90 | | 25 | 124.5 | 5.8 | |
| | 60 | 18.0 | 2000 | | .91 | | 30 | 134.2 | 5.0 | |
| | 70 | 18.0 | 2000 | | .91 | | 35 | 1429 | 4.4 | |
| | 80 | 18.0 | 2000 | | .91 | | 40 | 141.5 | 4.0 | |
| | 90 | 18.0 | 2000 | | .91 | | 45 | 128.9 | 3.6 | |
| | 100 | 18.0 | 2000 | | .91 | | 50 | 129.6 | 3.4 | |
| | 110 | 18.0 | 2000 | | .91 | | 60 | 121.7 | 3.0 | |
| | 120 | 18.0 | 2000 | | .91 = 794 gpm | | 70 | 120.1 | 2.7 | |
| | | • Water Level<br>Depth Below MP | | | | | 80 | 119.8 | 2.5 | |
| | 0 | | | T/T' | | | 90 | 117.2 | 2.3 | |
| | 1 | | | | | | 100 | 116.0 | 2.2 | |
| | 2 | | | | | | 110 | 115.8 | 2.1 | |
| | 3 | | | 41 | | | 120 | 114.6 | 2.0 | |
| | 4 | 175.5 | | 31 | | | | | | |
| | 5 | 165.1 | | 25 | | | | | | |
| | 6 | 151.4 | | 21 | | | | | | |
| | 7 | 141.0 | | 18 | | | | | | |
| | 8 | 136.7 | | 16 | | | | | | |
| | 9 | 130.3 | | 14.3 | | | | | | |
| | 10 | | | 13 | | | | | | |



ARCO, ET. AL. SORGHUM GULCH #1 JETTING TEST @ 2222.1

$T = \frac{264\,Q}{\Delta S}$

$Q = 794$ g/m

$\Delta S = 140.7 - 116.5 = 24.2$

$T = \frac{264 \cdot 794}{24.2}$

$T = 8660$ g/d/ft.

$T/T' = \frac{264\,Q}{\Delta S}$

$Q = 794$ g/m

$\Delta S = 155.2 - 114.6 = 40.6$

$T/T' = \frac{264 \cdot 794}{40.6}$

$T/T' = 5160$ g/d/ft.

ARCO, et al
SG#1

@2525
TOTAL DEPTH

# PUMP TEST DATA SHEET ; WELL NO. SG#1

1000' OPEN ENDED

PUMPED WELL ____________ OBSERVATION WELL ____________

DATE: 12-6-74 STATIC WATER LEVEL ____________

PUMP (ON) ~~(OFF)~~ AT 9:00
OFF AT 11:00
(DRAWDOWN) [✓ (RECOVERY)] TEST

WATER TEMP. ✓ CONDUCTIVITY ✓ SAMPLE TAKEN [✓ (YES)] (NO)

MP = MEASURING POINT MP ____ FT. ABOVE G.L. (GROUND LEVEL)

| LOCK TIME | TIME IN MIN. | ~~WATER LEVEL DEPTH BELOW MP~~ | | | PUMP RATE | CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | T/T' | PUMP RATE |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | TEMP | COND. | | FLUME | | 12 | 143. | 11 | |
| | 10 | 16 | 1200 | | .40 | | 14 | 127.5 | 9.6 | |
| | 20 | 17 | 1400 | | .61 | | 16 | 111.4 | 8.5 | |
| | 30 | 18 | 1530 | | .81 | | 18 | 98.7 | 7.6 | |
| | 40 | 18 | 1530 | | .86 | | 20 | 93. | 7.0 | |
| | 50 | 18.5 | 1650 | | .91 | | 25 | 96. | 5.8 | |
| | 60 | 18.5 | 1800 | | .94 | | 30 | 111. | 5.0 | |
| | 70 | 18.5 | 1850 | | .94 | | 35 | 132.5 | 4.4 | |
| | 80 | 18.5 | 1900 | | .94 | | 40 | 154. | 4.0 | |
| | 90 | 18.5 | 1900 | | .94 | | 45 | 153. | 3.6 | |
| | 100 | 18.5 | 1900 | | .94 | | 50 | 150.8 | 3.4 | |
| | 110 | 18.5 | 1900 | | .94 | | 60 | 146.3 | 3.0 | |
| | 120 | 18.5 | 1900 | | .94 = 839 g/m | | 70 | 146.1 | 2.7 | |
| | 0 | Water Level DEPTH BELOW MP | | T/T' | | | 80 | 145.5 | 2.5 | |
| | 1 | | | | | | 90 | 143.2 | 2.3 | |
| | 2 | 233.8 | | 61 | | | 100 | 141.8 | 2.2 | |
| | 3 | 217.3 | | 41 | | | 110 | 141.3 | 2.1 | |
| | 4 | 208.3 | | 31 | | | 120 | 139.6 | 2.0 | |
| | 5 | 200.5 | | 25 | | | | | | |
| | 6 | 196.6 | | 21 | | | | | | |
| | 7 | 185.7 | | 18 | | | | | | |
| | 8 | 178.8 | | 16 | | | | | | |
| | 9 | 172.4 | | 14.3 | | | | | | |
| | 10 | 162.2 | | 13 | | | | | | |

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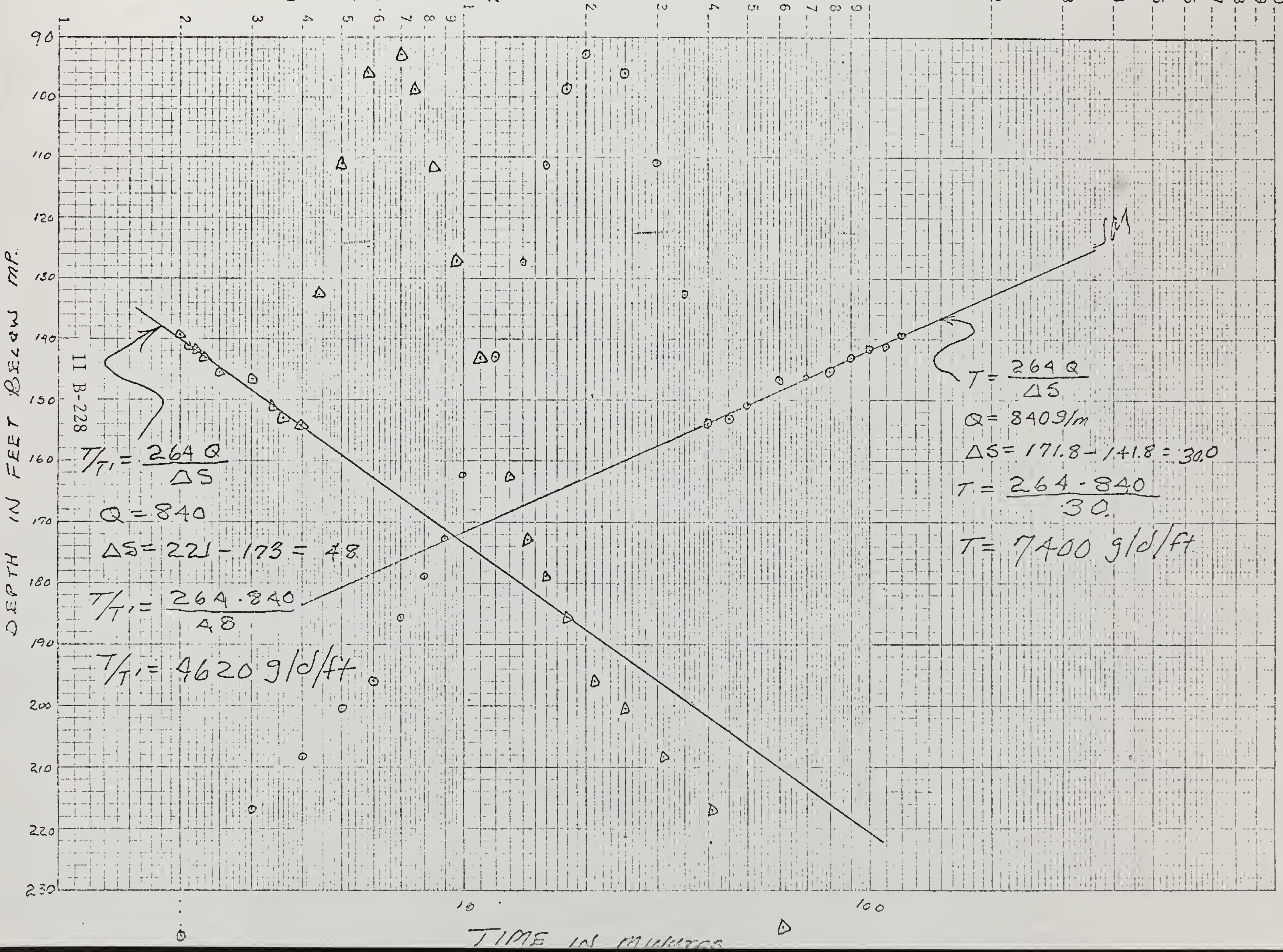
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 5493

SORGHUM GULCH #1 JETTING TEST @ T.O. 2525



$T/T_1 = \frac{264\,Q}{\Delta S}$

$Q = 840$

$\Delta S = 221 - 173 = 48$

$T/T_1 = \frac{264 \cdot 840}{48}$

$T/T_1 = 4620$ g/d/ft

$T = \frac{264\,Q}{\Delta S}$

$Q = 840$ g/m

$\Delta S = 171.8 - 141.8 = 30.0$

$T = \frac{264 \cdot 840}{30.}$

$T = 7400$ g/d/ft

SM

II B-228

# WELL SG-17

# JETTING TEST DATA

ARCO ET AL; SORGHUM GULCH #17; JETTING TEST @ 859'

## PUMP TEST DATA SHEET ; WELL NO. SG #17

Top of Parachute Creek

PUMPED WELL ________ OBSERVATION WELL ________

DATE: 11·10·74 STATIC WATER LEVEL ________

PUMP (ON) (OFF) AT ________ (DRAWDOWN) [✓ RECOVERY] TEST

WATER TEMP. ✓ CONDUCTIVITY ✓ SAMPLE TAKEN [✓ YES] (NO)

MP = MEASURING POINT MP 19 FT. ABOVE G.L.(GROUND LEVEL)

| CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | | PUMP RATE | CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | | PUMP RATE |
|---|---|---|---|---|---|---|---|---|---|
| | 0 | °C µmhos | | Flow | | 12 | 588.35 | 132/12 | 11.0 |
| | 10 | 8.5 1000 | | — | | 14 | 564.15 | 134/14 | 9.6 |
| | 20 | 12.0 800 | | .12 | | 16 | 549.80 | 136/16 | 8.5 |
| | 30 | 12.5 800 | | .12 | | 18 | 534.72 | 138/18 | 7.7 |
| | 40 | 12.5 800 | | .12 | | 20 | 529.45 | 140/20 | 7.0 |
| | 50 | 13.0 800 | | .12 | | 25 | 515.05 | 145/25 | 5.8 |
| | 60 | 13.0 800 | | .11 | | 30 | 504.07 | 150/30 | 5.0 |
| | 70 | 12.5 800 | | .11 | | 35 | 494.40 | 155/35 | 4.4 |
| | 80 | 12.0 800 | | .11 | | 40 | 487.10 | 160/40 | 4.0 |
| | 90 | 12.0 800 | | .11 | | 45 | 482.02 | 165/45 | 3.7 |
| | 100 | 12.0 800 | | .11 | | 50 | 478.90 | 170/50 | 3.4 |
| | 110 | 12.0 800 | | .11 | | 55 | 476.33 | 175/55 | 3.2 |
| | 120 | 12.0 800 | | .11 | | 60 | 474.24 | 180/60 | 3.0 |
| | | | T/T' | | | 70 | 470.20 | 190/70 | 2.7 |
| | 0 | | | | | 80 | 468.60 | 200/80 | 2.5 |
| | 1 | | | | | 90 | 466.60 | 210/90 | 2.3 |
| | 2 | | | | | 100 | 465.40 | 220/100 | 2.2 |
| | 3 | | | | | 110 | 464.25 | 230/110 | 2.1 |
| | 4 | | | | | 120 | 463.15 | 240/120 | 2.0 |
| | 5 | | | | | | 19 | | |
| | 6 | | | | | T | = 216 g/d/ft | | |
| | 7 | | | | | | | | |
| | 8 | | | | | T/4u | = 113 g/d/ft | | |
| | 9 | | | | | | | | |
| | 10 | 604.10 | 130/10 | 13.0 | | | | | |

Jetting Test Top of Mining Zone - Depth 1250 Ft

Arco, etal

# PUMP TEST DATA SHEET ; WELL NO. SG-17

PUMPED WELL ________ OBSERVATION WELL ________

DATE: 11-27-74 STATIC WATER LEVEL ________

PUMP (ON) (OFF) AT ________ 2237 0037 (DRAWDOWN) (RECOVERY) TEST

WATER TEMP. ✓ CONDUCTIVITY ✓ SAMPLE TAKEN [✓ YES] (NO)

MP = MEASURING POINT MP 14'5" FT. ABOVE G.L. (GROUND LEVEL)

| CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | | | PUMP RATE | CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | | PUMP RATE |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | Temp | Cond. | | Flume | | 12 | 500 | 11 | |
| | 10 | 17° | 1200 | | .26 | | 14 | 491.7 | 9.6 | |
| | 20 | 17.5° | 1300 | | .26 | | 16 | 485.5 | 8.5 | |
| | 30 | 18° | 1400 | | .25 | | 18 | 481.3 | 7.7 | |
| | 40 | 18° | 1400 | | .25 | | 20 | 478.9 | 7.0 | |
| | 50 | 18° | 1400 | | .25 | | 25 | 474.8 | 5.8 | |
| | 60 | 18° | 1400 | | .25 | | 30 | 470.0 | 5.0 | |
| | 70 | 18° | 1400 | | .25 | | 35 | 468.8 | 4.4 | |
| | 80 | 18° | 1400 | | .25 | | 40 | 465.5 | 4.0 | |
| | 90 | 18° | 1400 | | .25 | | 45 | 464.5 | 3.7 | |
| | 100 | 18° | 1400 | | .25 | | 50 | 463.6 | 3.4 | |
| | 110 | 18° | 1400 | | .25 | | 55 | 462.6 | 3.2 | |
| | 120 | 18° | 1400 | | .25 | | 60 | 462.0 | 3.0 | |
| | | | | | | | 70 | 460.6 | 2.7 | |
| | 0 | | | | | | 80 | 459.5 | 2.5 | |
| | 1 | | | | | | 90 | 458.7 | 2.3 | |
| | 2 | | | | | | 100 | 457.8 | 2.2 | |
| | 3 | | | | | | 110 | 457.1 | 2.1 | |
| | 4 | | | | | | 120 | 456.4 | 2.0 | |
| | 5 | | | | | | | T=1915 g/d/ft | | |
| | 6 | | | | | | | T/T' = 915.6 g/d/ft | | |
| | 7 | | | | | | | | | |
| | 8 | | | | | | | | | |
| | 9 | | | | | | | | | |
| | 10 | | | | | | | | | |

Arco Et. AL. Sorghum Gulch #17 Jetting Test @ 1336'

## PUMP TEST DATA SHEET ; WELL NO. SG #17

NEAR BASE OF MINE FLOOR

PUMPED WELL S.G. #17 OBSERVATION WELL ____

DATE: 12/1/74 STATIC WATER LEVEL ____

PUMP (ON) (~~OFF~~) AT 18:03 OFF 20:03 (DRAWDOWN) [✓ (RECOVERY)] TEST

WATER TEMP. ✓ CONDUCTIVITY ✓ SAMPLE TAKEN [✓ (YES)] (NO)

MP = MEASURING POINT MP 15' FT. ABOVE G.L. (GROUND LEVEL)

| CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | | | PUMP RATE | CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | T/T' | PUMP RATE |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | Temp. | Conduct. | | Flume | | 12 | 496.8 | 11 | |
| | 10 | 20° | 1200 | | — | | 14 | 487.6 | 9.6 | |
| | 20 | 21° | 1150 | | .36 | | 16 | 480.9 | 8.5 | |
| | 30 | 21 | 1150 | | .33 | | 18 | 477.0 | 7.7 | |
| | 40 | 21 | 1250 | | .32 | | 20 | 474.2 | 7.0 | |
| | 50 | 21 | 1200 | | .31 | | 25 | 469.2 | 5.8 | |
| | 60 | 21 | 1200 | | .32 | | 30 | 467.6 | 5.0 | |
| | 70 | 21 | 1200 | | .31 | | 35 | 465.0 | 4.4 | |
| | 80 | 21 | 12,00 | | .31 | | 40 | 464.3 | 4.0 | |
| | 90 | 21 | 1200 | | .32 | | 45 | 463.4 | 3.7 | |
| | 100 | 21 | 1250 | | .32 | | 50 | 462.4 | 3.4 | |
| | 110 | 21 | 1250 | | .32 | | 55 | 461.7 | 3.2 | |
| | 120 | 21 | 1250 | | .32 | | 60 | 461.0 | 3.0 | |
| | | | | T/T' | | | 70 | 459.7 | 2.7 | |
| | 0 | | | | | | 80 | 458.6 | 2.5 | |
| | 1 | | | | | | 90 | 457.7 | 2.3 | |
| | 2 | | | | | | 100 | 457.0 | 2.2 | |
| | 3 | | | | | | 110 | 456.3 | 2.1 | |
| | 4 | 574.7 | | 31 | | | 120 | 455.6 | 2.0 | |
| | 5 | 564.4 | | 25 | | | | | | |
| | 6 | 550.3 | | 21 | | | T = | 2125 g/d/ft | | |
| | 7 | 537.3 | | 18 | | | | | | |
| | 8 | 525.7 | | 16 | | | T/T' = | 1374 g/d/ft | | |
| | 9 | 518.1 | | 14 | | | | | | |
| | 10 | 510.8 | | 13 | | | | | | |

Jetting Test @ 1622 FT.

Arco, etal

# PUMP TEST DATA SHEET ; WELL NO. SG-17

PUMPED WELL ________ OBSERVATION WELL ________

DATE: 12-13-74 STATIC WATER LEVEL ________

PUMP (ON) (OFF) AT 21:19 (DRAWDOWN) (RECOVERY) TEST

OFF @ 23:19

WATER TEMP. ✓ CONDUCTIVITY ✓ SAMPLE TAKEN [✓ (YES)] (NO)

MP = MEASURING POINT MP ____ FT. ABOVE G.L. (GROUND LEVEL)

| CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | | | PUMP RATE | CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | | PUMP RATE |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | Temp | Cond | | Flume | | 12 | 530.4 | 11 | |
| | 10 | 19.0° | 1200 | | .39 | | 14 | 523.1 | 9.6 | |
| | 20 | 20.0° | 1250 | | .37 | | 16 | 519.4 | 8.5 | |
| | 30 | 21.0° | 1200 | | .37 | | 18 | 516.4 | 7.7 | |
| | 40 | 21.0° | 1200 | | .37 | | 20 | 513.9 | 7.0 | |
| | 50 | 21.0° | 1200 | | .37 | | 25 | 509.0 | 5.8 | |
| | 60 | 21.0° | 1200 | | .37 | | 30 | 506.5 | 5.0 | |
| | 70 | 21.0° | 1200 | | .37 | | 35 | 504.4 | 4.4 | |
| | 80 | 21.0° | 1200 | | .36 | | 40 | 503.3 | 4.0 | |
| | 90 | 21.0° | 1200 | | .36 | | 45 | 502.6 | 3.7 | |
| | 100 | 21.0° | 1200 | | .36 | | 50 | 501.6 | 3.4 | |
| | 110 | 21.0° | 1200 | | .36 | | 55 | 500.7 | 3.2 | |
| | 120 | 21.0° | 1200 | | .36 | | 60 | 499.9 | 3.0 | |
| | | | | | | | 70 | 498.4 | 2.7 | |
| | 0 | | | T/T' | | | 80 | 497.1 | 2.5 | |
| | 1 | | | | | | 90 | 496.0 | 2.3 | |
| | 2 | | | | | | 100 | 495.0 | 2.2 | |
| | 3 | | | | | | 110 | 494.0 | 2.1 | |
| | 4 | | | 31 | | | 120 | 493.2 | 2.0 | |
| | 5 | 572.4 | | 25 | | | | | | |
| | 6 | 564.9 | | 21 | | | | | | |
| | 7 | 558.6 | | 18 | | | | | | |
| | 8 | 550.3 | | 16 | | | | | | |
| | 9 | 544.0 | | 14 | | | | | | |
| | 10 | 538.8 | | 13 | | | | | | |

ARCO, ET AL. JETTING TEST

**PUMP TEST DATA SHEET ; WELL NO.** SG#17

@TOP GARDEN GULCH 2405'

1000' OF OF OPEN END PIPE

PUMPED WELL ________ OBSERVATION WELL ________

DATE: 1-9-75 STATIC WATER LEVEL ________

PUMP (ON) (OFF) AT ________ (DRAWDOWN) (RECOVERY) TEST

WATER TEMP. 24.5 CONDUCTIVITY 3800 SAMPLE TAKEN [✓ YES] (NO)

MP = MEASURING POINT MP ____ FT. ABOVE G.L.(GROUND LEVEL)

| CLOCK TIME | TIME IN MIN. | ~~WATER LEVEL DEPTH BELOW MP~~ | | | PUMP RATE | CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | | PUMP RATE |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | °C | μmohs | | FLUME | | 12 | 516 | 132/12 | 11.0 |
| | 10 | 2.0 | 1500 | | .47 | | 14 | 498.4 | 134/14 | 9.6 |
| | 20 | 20 | 1600 | | .33 | | 16 | 495.2 | 136/16 | 8.5 |
| | 30 | 20 | 1700 | | .31 | | 18 | 491.9 | 138/18 | 7.7 |
| | 40 | 20 | 1600 | | .23 | | 20 | 490.0 | 140/20 | 7.0 |
| | 50 | 22 | 6000 | | .24 | | 25 | 487.0 | 145/25 | 5.8 |
| | 60 | 23 | 6500 | | .33 | | 30 | 487.8 | 150/30 | 5.0 |
| | 70 | 23 | 5200 | | .22 | | 35 | 487.9 | 155/35 | 4.4 |
| | 80 | 23 | 5200 | | .25 | | 40 | 487.9 | 160/40 | 4.0 |
| | 90 | 23 | 5200 | | .30 | | 45 | 488. | 165/45 | 3.7 |
| | 100 | 23 | 4400 | | .31 | | 50 | 491.1 | 170/50 | 3.4 |
| | 110 | 23 | 4400 | | .35 | | 55 | 492.2 | 175/55 | 3.2 |
| | 120 | 23 | 4400 | | .33 = 162 g/m | | 60 | 493.4 | 180/60 | 3.0 |
| | | WATER LEVEL DEPTH BELOW MP | | | | | 70 | 494.0 | 190/70 | 2.7 |
| | 0 | | | T/T | | | 80 | 492.9 | 200/80 | 2.5 |
| | 1 | | | | | | 90 | 492.4 | 210/90 | 2.3 |
| | 2 | | | | | | 100 | | 220/100 | 2.2 |
| | 3 | | | | | | | | | |
| | 4 | | | | | | | | | |
| | 5 | | | | | | | | | |
| | 6 | | | | | | | | | |
| | 7 | | | | | | | | | |
| | 8 | | | | | | | | | |
| | 9 | | | | | | | | | |
| | 10 | 517.2 | | 130/10 | 13.0 | | | | | |

## WELL SG-20
## JETTING AND DRILL STEM
## TEST DATA

Jetting Test, Top of Parachute Creek, SG

# PUMP TEST DATA SHEET ; WELL NO. SG-20

PUMPED WELL SG-20 OBSERVATION WELL ____

DATE: 12/4 STATIC WATER LEVEL ____

PUMP (ON) ~~(OFF)~~ AT 9:50 AM ~~(DRAWDOWN)~~ [✓ (RECOVERY)] TEST

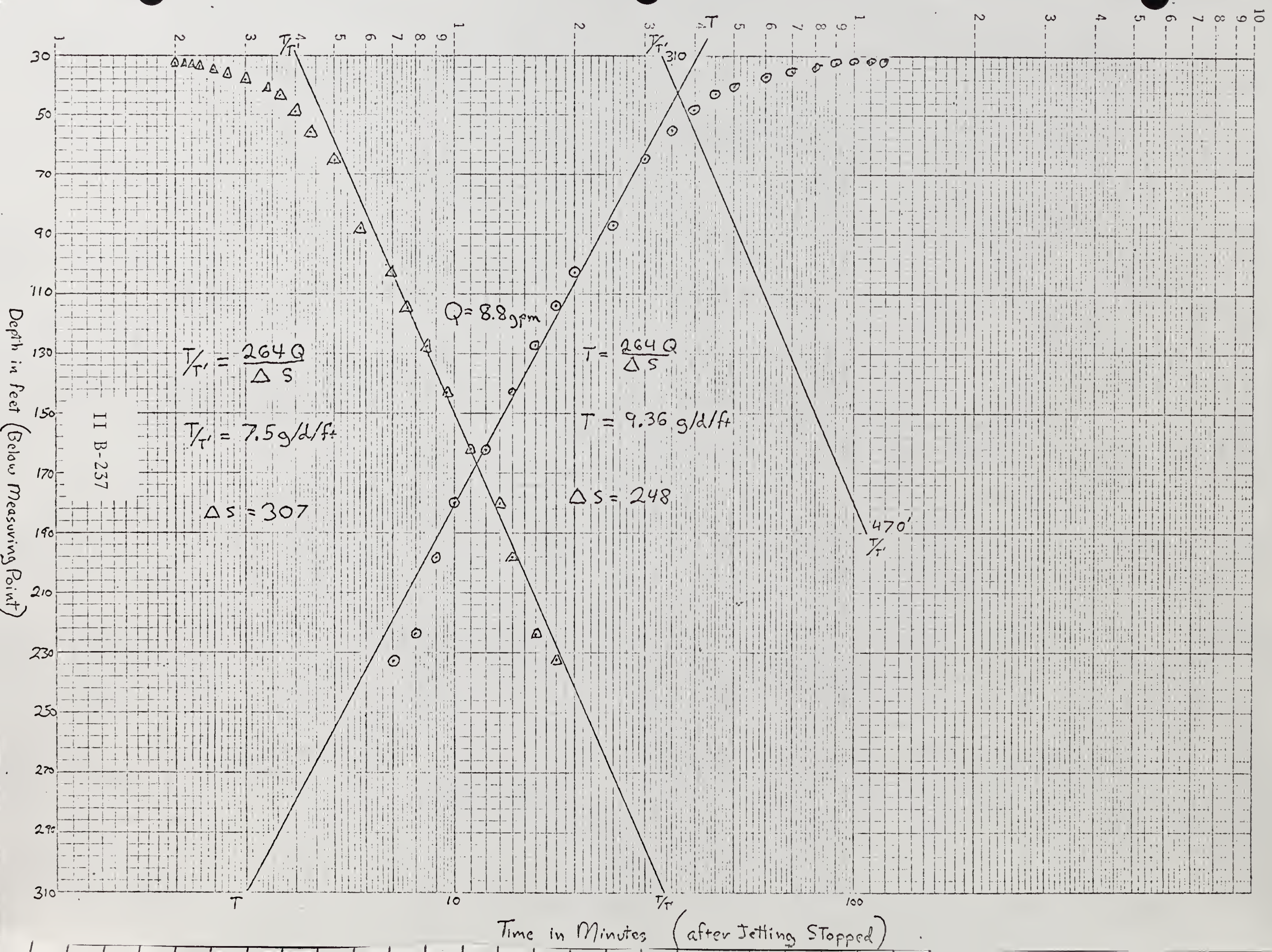
WATER TEMP. 12°C off @ 11:50 CONDUCTIVITY 850 mμ SAMPLE TAKEN [✓ (YES)] ~~(NO)~~

MP = MEASURING POINT MP 5' FT. ABOVE G.L.(GROUND LEVEL)

| CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | | | PUMP RATE | CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | T/T' | PUMP RATE |
|---|---|---|---|---|---|---|---|---|---|---|
| 9:50 | 0 | Temp °C | Conductivity | | Flume | | 12 | 162.9 | | |
| | 10 | 11° | 800 | | Not UP | | 14 | 142.8 | | |
| | 20 | 11° | 850 | | Not UP 10± | | 16 | 127.3 | | |
| | 30 | 11° | 850 | | " | | 18 | 114.0 | | |
| | 40 | 10.5° | 850 | | " | | 20 | 102.3 | | |
| | 50 | 11° | 850 | | " | | 25 | 80.7 | | |
| | 60 | 10.5° | 850 | | " | | 30 | 65.6 | | |
| | 70 | 11° | 850 | | " | | 35 | 55.5 | | |
| | 80 | 11.5° | 850 | | .02 | | 40 | 48.2 | | |
| | 90 | 12° | 850 | | .03 | | 45 | 43.9 | | |
| | 100 | 12° | 850 | | .03 | | 50 | 40.9 | | |
| | 110 | 12° | 850 | | .04 | | 60 | 36.9 | | |
| | 120 | 12° | 850 | | .04 | | 70 | 35.1 | | |
| | | | | | Q = 8.3 gpm | | 80 | 33.6 | | |
| | | | | T/T' | | | 90 | 32.8 | | |
| | 1 | | | | | | 100 | 31.9 | | |
| | 2 | | | | | | 110 | 31.2 | | |
| | 3 | | | | | | 120 | 31.0 | | |
| | 4 | | | | | | | | | |
| | 5 | | | | | | | | | |
| | 6 | | | | | | T | = 9.36 g/d/ft | | |
| | 7 | 232.7 | | | | | | | | |
| | 8 | 223.8 | | | | | T/Ti | = 7.5 g/d/ft | | |
| | 9 | 193.4 | | | | | | | | |
| | 10 | 180.7 | | | | | | | | |

Jetting Test; Top of Parachute Creek 313

K&E SEMI-LOGARITHMIC • 3 CYCLES × 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.
46 5493



Jet Test Top of Mine Zone 986'

## PUMP TEST DATA SHEET ; WELL NO. SG-20

PUMPED WELL SG-20 OBSERVATION WELL ____

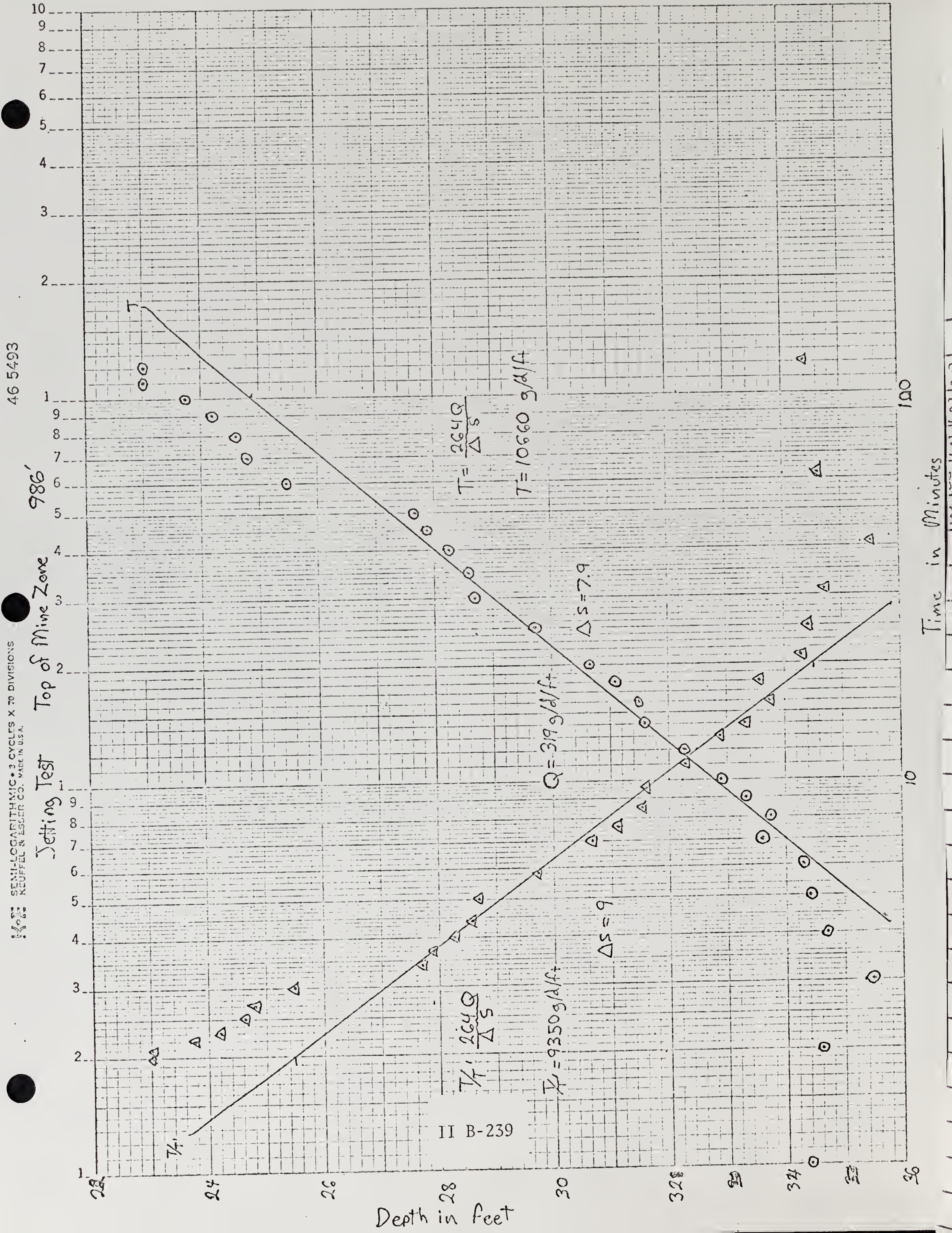
DATE: 12/12/74 STATIC WATER LEVEL ____

PUMP (ON) ([illegible]) AT 0245 ~~(DRAWDOWN)~~ [✓ (RECOVERY)] TEST

WATER TEMP. ✓ CONDUCTIVITY ✓ SAMPLE TAKEN [✓ (YES)] ~~(NO)~~

MP = MEASURING POINT MP 2.2' FT. ABOVE G.L. (GROUND LEVEL)

| CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | | | PUMP RATE | CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | $T/T'$ | PUMP RATE |
|---|---|---|---|---|---|---|---|---|---|---|
| | [illegible] | Cond | Temp | | Flume | | 12 | 32.25 | 11 | |
| | 10 | 2400 | 19° | | 0 | | 14 | 31.6 | 9.5 | |
| | 20 | 2400 | 19° | | 0 | | 16 | 31.5 | 8.5 | |
| | 30 | 2600 | 20° | | .40 | | 18 | 31.09 | 7.6 | |
| | 40 | 2600 | 20° | | .46 | | 20 | 30.64 | 7.0 | |
| | 50 | 2600 | 20° | | .50 | | 25 | 29.73 | 5.8 | |
| | 60 | 2600 | 20° | | .51 | | 30 | 28.67 | 5.0 | |
| | 70 | 2600 | 20° | | .51 | | 35 | 28.6 | 4.4 | |
| | 80 | 2800 | 20° | | .51 | | 40 | 28.25 | 4.0 | |
| | 90 | 2800 | 20° | | .51 | | 45 | 27.9 | 3.7 | |
| | 100 | 2800 | 20° | | .51 | | 50 | 27.65 | 3.4 | |
| | 110 | 2800 | 20° | | .51 | | 60 | 25.45 | 3.0 | |
| | 120 | 2800 | 20° | | .51 | | 70 | 24.80 | 2.7 | |
| | | | | | | | 80 | 24.6 | 2.5 | |
| | | | | $T/T'$ | | | 90 | 24.2 | 2.3 | |
| | 1 | 34.46 | | 121 | | | 100 | 23.76 | 2.2 | |
| | 2 | 34.6 | | 61 | | | 110 | 23.02 | 2.1 | |
| | 3 | 35.5 | | 41 | | | 120 | 23.01 | 2.0 | |
| | 4 | 34.65 | | 31 | | | | | | |
| | 5 | 34.4 | | 25 | | | | | | |
| | 6 | 34.3 | | 21 | | | | | | |
| | 7 | 33.6 | | 18 | | | | | | |
| | 8 | 33.75 | | 16 | | | | | | |
| | 9 | 33.3 | | 14 | | | | | | |
| | 10 | 32.9 | | 13 | | | | | | |


Jetting Test
Top of Mine Zone
986'
46 5493
SEMI-LOGARITHMIC • 3 CYCLES X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.
$T = \frac{264Q}{\Delta s}$
T = 10660 g/d/ft
Q = 319 g/d/ft
Δs = 7.9
Δs = 9
$T/T' = \frac{264Q}{\Delta s}$
T/T' = 9350 g/d/ft
T
T/T'
Time in Minutes
10
100
Depth in feet
22
24
26
28
30
32
34
36
1
2
3
4
5
6
7
8
9
10

II B-239

DST #1

# PUMP TEST DATA SHEET ; WELL NO. SG-20

PUMPED WELL SG-20 OBSERVATION WELL ________

DATE: 12/8/74 STATIC WATER LEVEL ________

PUMP (ON) (OFF) AT ________ ~~(DRAWDOWN)~~ [✓ (RECOVERY)] TEST

WATER TEMP. ______ CONDUCTIVITY ________ SAMPLE TAKEN ~~(YES)~~ [✓ (NO)]

MP = MEASURING POINT MP 10.5 FT. ABOVE G.L.(GROUND LEVEL)

Recovery

| CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | | PUMP RATE | CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | | PUMP RATE |
|---|---|---|---|---|---|---|---|---|---|
| 3:13 | – | 577.6 | | | | Time | Conduct | °C | |
| 3:25 | | Cycle Tool | | | 855 | 60 | 2800 | 19° | |
| 3:28 | 0 | Tool OPen | | | | 70 | 2800 | 19° | |
| 3:28½ | ½ | 500 (apx) | | | off@ | 906 | | | |
| 3:29 | 1 | 300 (apx) | | | | | | | |
| | 2 | 140 (apx) | | | | | 27.3 | gpm | Production Rat |
| | 3 | 40 (apx) | | | | | | | |
| | 4 | 16.1 | | | | | | | |
| | 5 | 16.7 | | | | | | | |
| | 7 | 15.6 | | | | | | | |
| | 9 | 15.4 | | | | | | | |
| | 11 | 15.2 | | | | | | | |
| | 15 | 15.0 | | | | | | | |
| | 20 | 16.0 | | | | | | | |
| | 25 | 16.0 | | | | | | | |
| | 30 | 15.4 | | | | | | | |
| | | | | | | | | | |
| | Conductivity | | | | | | | | |
| | Time | Conduct | Temp | °C | | | | | |
| 7:55 | 0 | 2800 | 13° | | | | | | |
| | 10 | 2800 | 15.5° | | | | | | |
| | 20 | 2800 | 16.5° | | | | | | |
| | 30 | 2800 | 17.0 | | | | | | |
| | 40 | 2750 | 18.5 | | | | | | |
| | 50 | 2800 | 18.5 | | | | | | |

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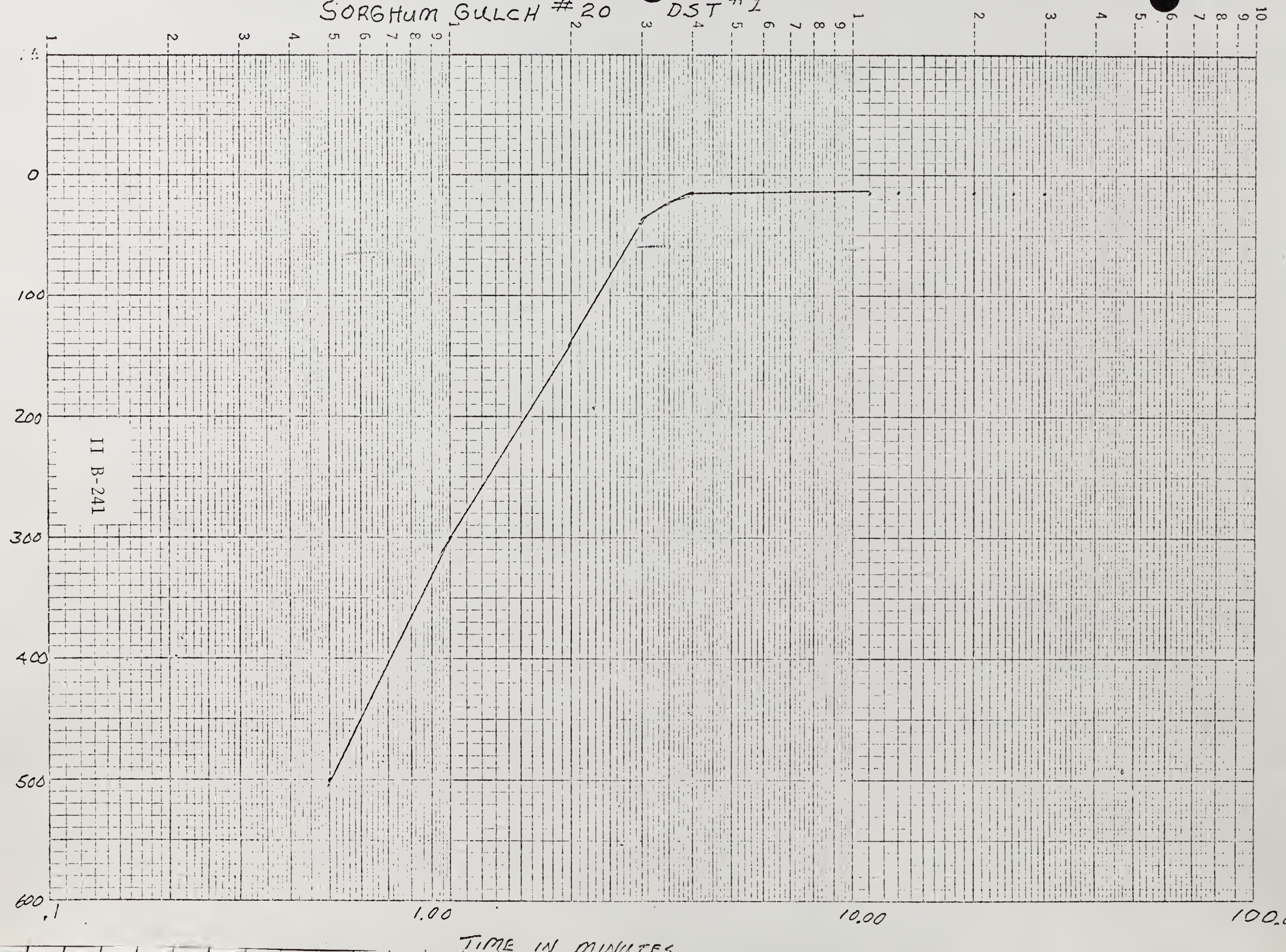
SORGHUM GULCH #20 DST #1



II B-241

DST #2 981' Top of Mine Zone

# PUMP TEST DATA SHEET ; WELL NO. SG-20

PUMPED WELL ________ OBSERVATION WELL ________

DATE: ________ STATIC WATER LEVEL ________

PUMP (ON) (OFF) AT ________ (DRAWDOWN) (RECOVERY) TEST

WATER TEMP. ______ CONDUCTIVITY ______ SAMPLE TAKEN (YES) (NO)

MP = MEASURING POINT MP 84' FT. ABOVE G.L. (GROUND LEVEL)

| CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | | PUMP RATE | CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | | PUMP RATE |
|---|---|---|---|---|---|---|---|---|---|
| | | 854.13' | | | 1116 | 80 | 11.4 | | |
| 0952 | | Cycle Tool | | | 1126 | 90 | 10.5 | | |
| 0956 | 0 | Tool Open | | | | | | | |
| 957 | ½ | 810.6 | | | | | | | |
| 958 | 1 | 764.8 | | | | | Cond. | Temp? | 9/m ≈ |
| 959 | 2 | ~~633~~ 727.2 | | | 1615 | 0 | 2300 | 12.5 | 9 |
| 000 | 3 | 682.6 | | | 1625 | 10 | 2400 | 12.5 | 12. 9/m |
| 001 | 4 | 642.9 | | | 1635 | 20 | 2250 | 12.5 | 13 9/m ≈ |
| 003 | 5 | 604.0 | | | 1645 | 30 | 2300 | 13 | 12 |
| 005 | 7 | 540.3 | | | 1655 | 40 | 2400 | 13.5 | 12 |
| 007 | 9 | 472.9 | | | 1705 | 50 | 2400 | 14 | 12 |
| 001 | 11 | 413.1 | | | 1715 | 60 | 2400 | 14 | 12 |
| 016 | 15 | 311.9 | | | | | | | |
| 021 | 20 | 207.8 | | | | | | | |
| | 25 | 133.4 | | | | | | | |
| | 30 | 84.8 | | | | | | | |
| | 35 | 50.1 | | | | | | | |
| | 40 | 33.1 | | | | | | | |
| | 45 | 24.7 | | | | | | | |
| | 50 | 19.6 | | | | | | | |
| | 55 | 16.1 | | | | | | | |
| | 60 | 14.5 | | | | | | | |
| | 65 | 13.2 | | | | | | | |
| | 70 | 13.0 | | | | | | | |
| | 75 | 11.9 | | | | | | | |

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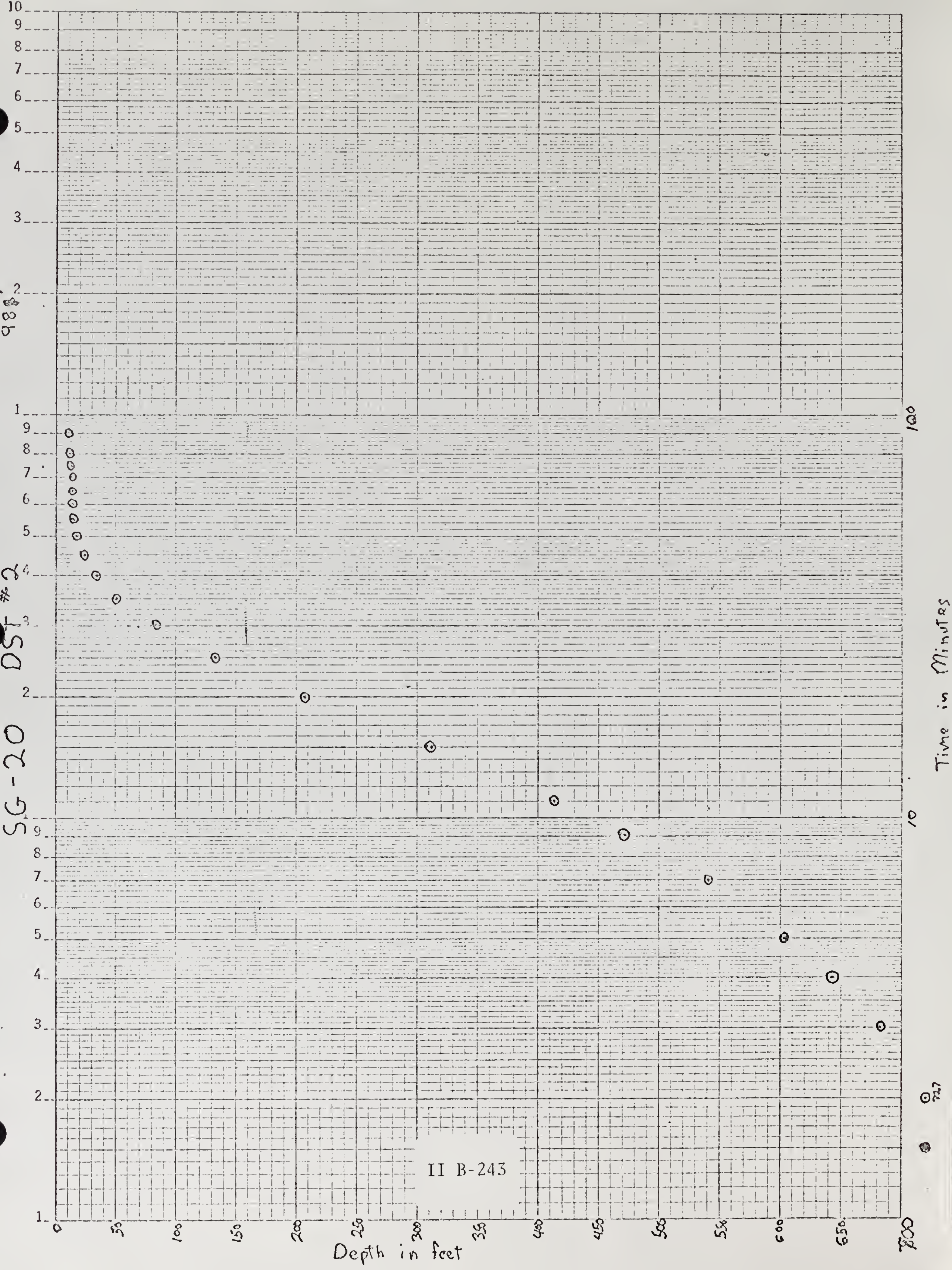

II B-243

# WELL SG-21
# JETTING AND DRILL STEM
# TEST DATA

3/16 of open ended Pipe

**PUMP TEST DATA SHEET ; WELL NO.** SG#21

Top Parachute Cr. 650' Test @ 676'

PUMPED WELL ______ OBSERVATION WELL ______

DATE: 12-16-74 STATIC WATER LEVEL ______

PUMP (ON) (OFF) AT 600 / 800 (DRAWDOWN) (RECOVERY) TEST

WATER TEMP. 13 CONDUCTIVITY 1100 SAMPLE TAKEN [✓ YES] (NO)

MP = MEASURING POINT MP 9.1 FT. ABOVE G.L.(GROUND LEVEL)

| CLOCK TIME | TIME IN MIN. | ~~WATER-LEVEL DEPTH-BELOW-MP~~ | | | PUMP RATE | CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | T/T' | PUMP RATE |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | TEMP | COND. | | FLUME | | 12 | 328.0 | 11 | |
| | 10 | 12 | 1000 | | .10 | | 14 | 301.7 | 9.6 | |
| | 20 | 12 | 975 | | .08 | | 16 | 279.1 | 8.5 | |
| | 30 | 12 | 925 | | .05 | | 18 | 263.0 | 7.7 | |
| | 40 | 12 | | | .07 | | 20 | 246.3 | 7. | |
| | 50 | 12 | | | .05 | | 25 | 213.6 | 5.8 | |
| | 60 | 12.5 | | | .06 | | 30 | 190. | 5 | |
| | 70 | 12.5 | | | .06 | | 35 | 170.8 | 4.4 | |
| | 80 | 12.5 | | | .05 | | 40 | 163.6 | 4. | |
| | 90 | 12.5 | | | .05 | | 45 | 146.5 | 3.7 | |
| | 100 | 12.5 | | | .05 | | 50 | 142.5 | 3.4 | |
| | 110 | 12.5 | | | .05 | | 60 | 133.4 | 3. | |
| | 120 | 12.5 | | | .05=11 g/m | | 70 | 128. | 2.7 | |
| | | Water Level Depth Below MP | | T/T' | | | 80 | 122.9 | 2.5 | |
| | 0 | | | | | | 90 | 120.7 | 2.3 | |
| | 1 | | | | | | 100 | 119.6 | 2.2 | |
| | 2 | 513 | | 61 | | | 110 | 118.4 | 2.1 | |
| | 3 | 484.2 | | 41 | | | 120 | 117.6 | 2.0 | |
| | 4 | 459. | | 31 | | | | | | |
| | 5 | 446 | | 25 | | | | | | |
| | 6 | 423.8 | | 21 | | | | | | |
| | 7 | 405.8 | | 18 | | | | | | |
| | 8 | 394.3 | | 16 | | | | | | |
| | 9 | 378.6 | | 14.3 | | | | | | |
| | 10 | 364.5 | | 13 | | | | | | |

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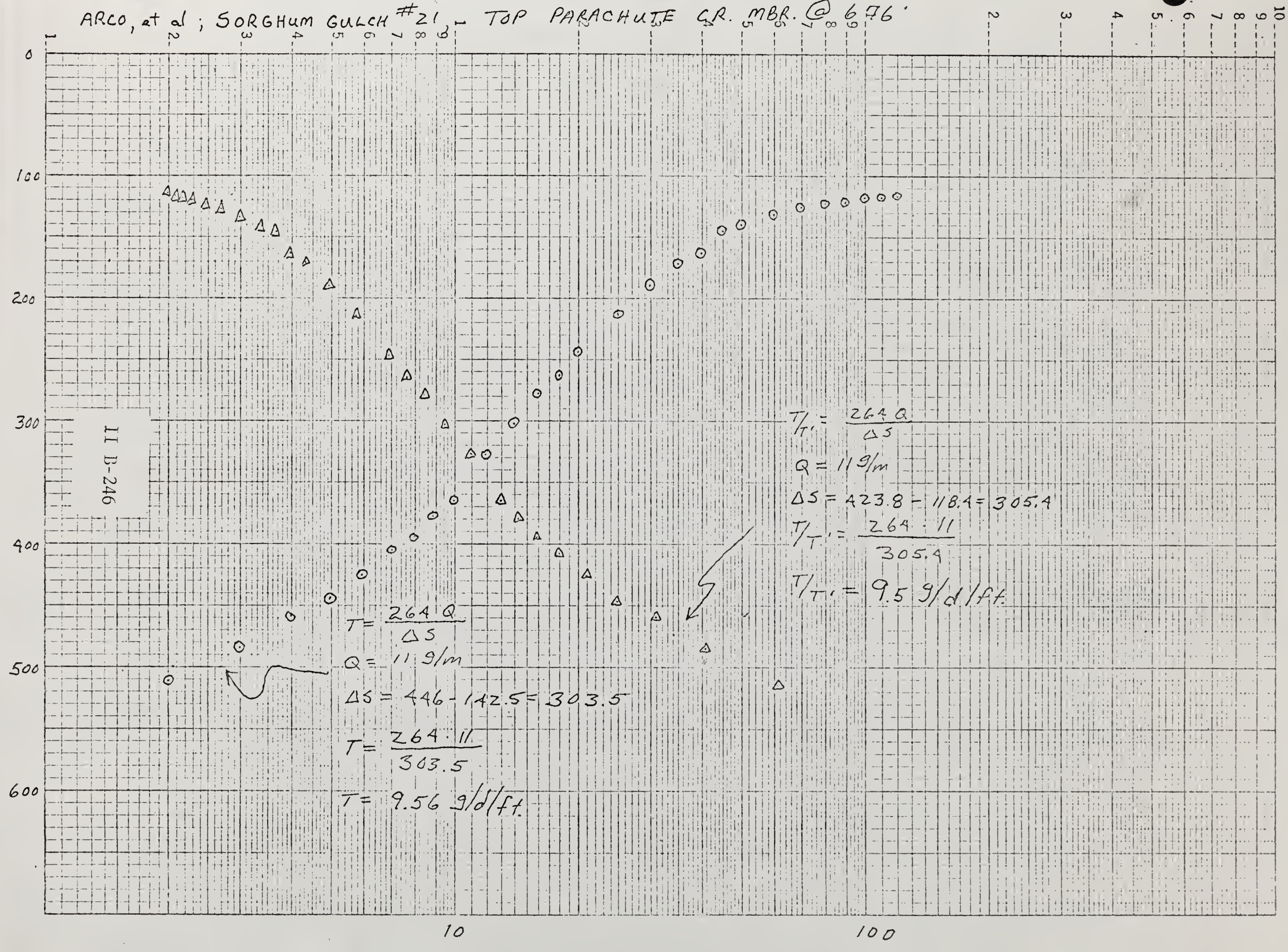
ARCO, et al ; SORGHUM GULCH #21 - TOP PARACHUTE CR. MBR. @ 676'



$T = \frac{264\,Q}{\Delta s}$

$Q = 11\ g/m$

$\Delta s = 446 - 142.5 = 303.5$

$T = \frac{264 \cdot 11}{303.5}$

$T = 9.56\ g/d/ft.$

$T/T' = \frac{264\,Q}{\Delta s}$

$Q = 11\ g/m$

$\Delta s = 423.8 - 118.4 = 305.4$

$T/T' = \frac{264 \cdot 11}{305.4}$

$T/T' = 9.5\ g/d/ft.$

II B-246

ARCO, et al

SG-21

# DST # 1

INTERVAL TESTED : 1000' - 1035'

$H_2O$ Prod. 300 gpm prior to testing while circulating
Bottom Packer set @ 1000 ft. @ 1139 hrs.
Tool opened @ 1145 hrs.
closed @ 1151
reopened @ 1225
ISIP for 34 min. from 1151 — 1225 hrs.

## I. Recovery Test

from 1225 to 1355 ; 90 min.
from 728 ft to 161 ft.

## II. JETTING TEST

Jetted for 60 min. from 1606 to 1709
Samples : $H_2O$ ✓ ; Gas ✓
Stablized Cond. 850 μmhos
" $H_2O$ Prod. 10 gpm

## III. INJECTIVITY Tests

ⓐ. Down Anulus

| Start | Stop | GPM | MIN. |
|---|---|---|---|
| 1842 | 1902 | 21 | 20 |
| 1902 | 1922 | 39 | 20 |
| 1922 | 1942 | 61 | 20 |
| recovery (decline) | | | 20 |

ⓑ. Down Drill Pipe

| Start | Stop | GPM | MIN. |
|---|---|---|---|
| 2013 | 2033 | 2 | 20 |
| 2033 | 2053 | 5 | 20 |
| 2053 | 2103 | 11 | 20 |
| 2103 | 2113 | 21 | 20 |

1 GPM to surface (overflow)

## Depth of Tools

1. Sperry-Sun top gauge rec. 955 ft.
2. " " Bottom 1018 ft.
3. Johnston inside rec. 990 ft.
4. " outside rec. 1008 ft.
5 top Packer 998 ft.
6. Bottom Packer 1000 ft.

## Results of Johnston Testing

| Recorder | | Outside | Inside |
|---|---|---|---|
| 1. ISIP | | 357 | 369 |
| 2. Static $H_2O$ | | 375 | 386 |
| 3. Max. Build-up PSI : | | | |
| | 2 gpm | 453 | 461 |
| | 5 gpm | 462 | 474 |
| | 11 gpm | 480 | 489 |

## PUMP TEST DATA SHEET ; WELL NO. SG#21

INTERVAL - 1000'-1036'

PUMPED WELL ________ OBSERVATION WELL ________

DATE: 12-20-74 STATIC WATER LEVEL ________

PUMP (ON) (OFF) AT ________ (DRAWDOWN) (RECOVERY) TEST

WATER TEMP. ______ CONDUCTIVITY ______ SAMPLE TAKEN (YES) (NO)

MP = MEASURING POINT MP 77 FT. ABOVE G.L. (GROUND LEVEL)

| CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | | PUMP RATE | | CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | | PUMP RATE |
|---|---|---|---|---|---|---|---|---|---|---|
| | ① | Recovery Test | | | | | 70 | 166.6 | | |
| 2:25 | 0 | 728.4 | ② JETTING TEST | | | | 80 | 163.5 | | |
| | 1 | 657.4 | Time Min | °C | Mmhos | GPM | 90 | 161.2 | | |
| | 2 | 572.2 | 0 | 9 | 1050 | 15 | ③ | INJECTIVITY | | DOWN ANNULUS |
| | 3 | 517.0 | 10 | 10 | 900 | 11 | 0 | N/A | GPM | |
| | 4 | 467.8 | 20 | 10 | 875 | 11 | 2 | 165.9 | 21 | |
| | 5 | 425.6 | 30 | 10 | 875 | 10 | 4 | 164.8 | | |
| | 6 | 390.4 | 40 | 10 | 875 | 10 | 6 | 164.3 | | |
| | 7 | 362.5 | 50 | 10.5 | 850 | 10 | 8 | 163.7 | | |
| | 8 | 339.4 | 60 | 10.5 | 850 | 10 | 10 | 162.9 | | |
| | 9 | 320.2 | | | | | 12 | 162.3 | | |
| | 10 | 305.1 | | | | | 14 | 161.8 | | |
| | 12 | 283.7 | | | | | 16 | 161.3 | | |
| | 14 | 268.4 | | | | | 18 | 160.7 | | |
| | 16 | N/A | | | | | 20 | 160.2 | 39 | |
| | 18 | 247.7 | | | | | 22 | 159.7 | | |
| | 20 | 239.2 | | | | | 24 | 159.3 | | |
| | 25 | 222.2 | | | | | 26 | 158.8 | | |
| | 30 | 209.0 | | | | | 28 | 158.4 | | |
| | 35 | 198.5 | | | | | 30 | 157.9 | | |
| | 40 | 190.3 | | | | | 32 | 157.5 | | |
| | 45 | 183.7 | | | | | 34 | 157. | | |
| | 50 | 178.6 | | | | | 36 | 156.7 | | |
| | 55 | 174.4 | | | | | 38 | 156.3 | | |
| | 60 | 171.4 | | | | | 40 | 155.8 | 61 | |

DST #1 (CONT)

# PUMP TEST DATA SHEET ; WELL NO. SG#21

PUMPED WELL ____________ OBSERVATION WELL ____________

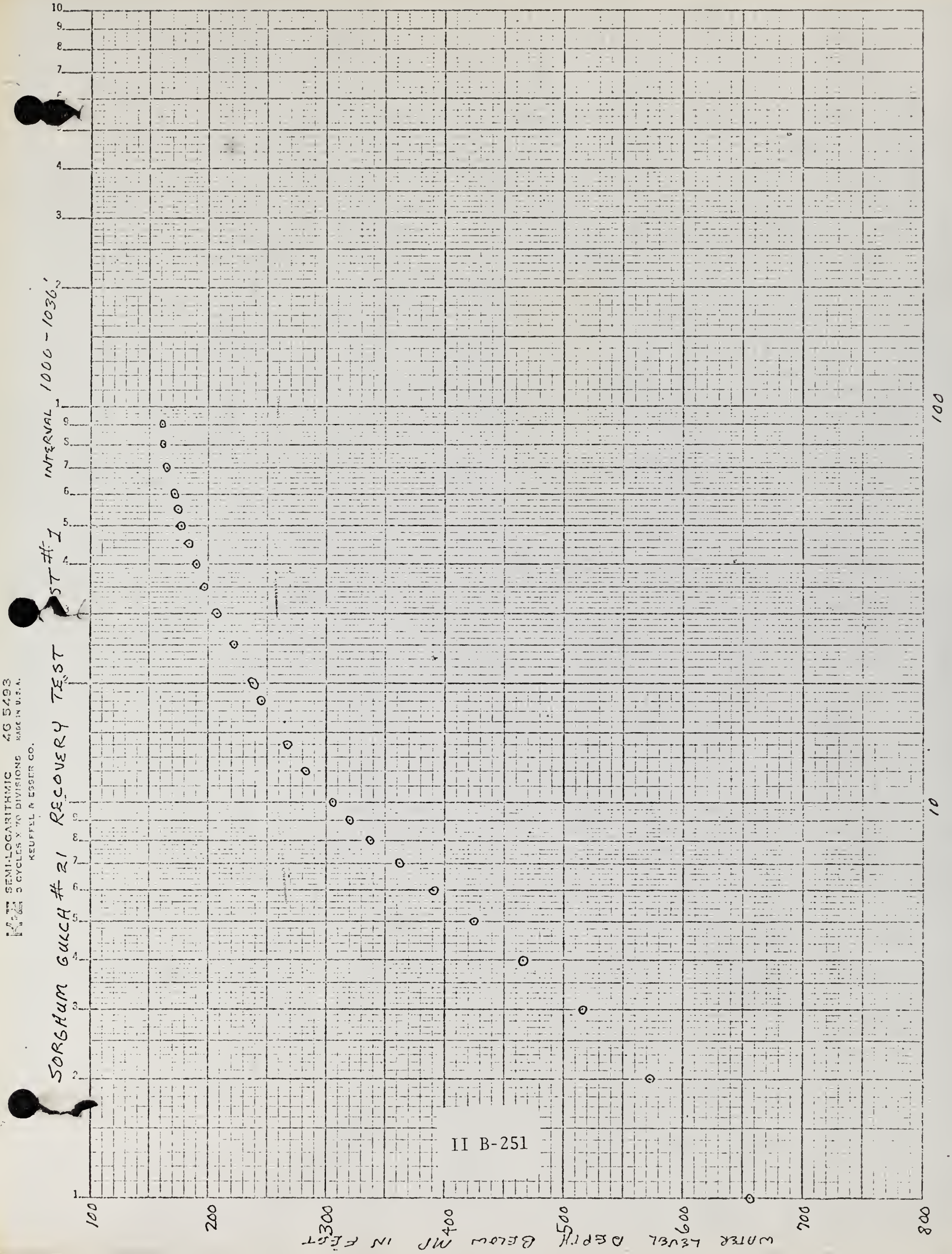
DATE: ________ STATIC WATER LEVEL ________

PUMP (ON) (OFF) AT ________ (DRAWDOWN) (RECOVERY) TEST

WATER TEMP. ______ CONDUCTIVITY ______ SAMPLE TAKEN (YES) (NO)

MP = MEASURING POINT MP ____ FT. ABOVE G.L. (GROUND LEVEL)

| CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | | PUMP RATE | CLOCK TIME | TIME IN MIN. | WATER LEVEL DEPTH BELOW MP | | PUMP RATE |
|---|---|---|---|---|---|---|---|---|---|
| | 42 | 155.4 | 61 | | | (4.) | INJECTIVITY | DOWN D.P. | |
| | 44 | 155.2 | | | 2113 | 0 | 8.5' | | |
| | 46 | 154.7 | | | | 1 | 23.7 | | |
| | 48 | 154.4 | | | | 2 | N/A | | |
| | 50 | 154.0 | | | | 3 | 40.2 | | |
| | 52 | 153.5 | | | | 4 | 46.3 | | |
| | 54 | 153.0 | | | | 5 | 52.9 | | |
| | 56 | 152.8 | | | | 6 | 56.3 | | |
| | 58 | 152.4 | | | | 7 | 61.4 | | |
| | 60 | 152.2 | | | | 8 | 65.6 | | |
| | | DECLINE | | | | 9 | 70.1 | | |
| | 0 | 152.2 | | | | 10 | 73.2 | | |
| | 2 | 152. | | | | 12 | 80.2 | | |
| | 4 | 151.8 | | | | 14 | 86.8 | | |
| | 6 | 151.7 | | | | 16 | 91.9 | | |
| | 8 | N/A | | | | 18 | 96.7 | | |
| | 10 | 151.5 | | | | 20 | 101. | | |
| | 15 | 151.4 | | | | 25 | 111.2 | | |
| | 20 | 151.4 | | | | 30 | 117.4 | | |


SORGHUM GULCH #21 RECOVERY TEST #1 INTERVAL 1000 - 1036'

K&E SEMI-LOGARITHMIC 46 5493
3 CYCLES X 70 DIVISIONS MADE IN U.S.A.
KEUFFEL & ESSER CO.